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ABSTRACT

Thirteen conference papers focus on the education of educable (EMR) and trainable (TMR) mentally retarded children. Topics include comparisons of development of reasoning, moral judgment, moral conduct, and long term memory in normals and retardates. Other papers examine use of an interactive unit in teaching arithmetic, verbal information processing of EMRs on quantitative verbal problems, application of learning theory to evaluation of language development, and use of music and social reinforcement to increase group attending behavior. One paper describes a Down's Syndrome preschool program and four papers describe various aspects of the TMR program in Roanoke County, Virginia (overview, curriculum, use of music, and use of paraprofessionals). (KW)

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Exceptional Children Conference Papers:

Education of the Educable and Trainable Mentally Handicapped

Papers Presented at the

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Table of Contents

A Comparison of the Development of Reasoning in Normals and Retardates 1
Susan J. Robb and Beth Stephens, Temple University

A Comparison of the Development of Moral Judgment in Normals and Retardates 22
Edward J. Mahaney, Jr. and Beth Stephens, Temple University

A Comparison of the Development of Moral Conduct in Normals and Retardates 41
Gary W. Moore and Beth Stephens, Temple University

Long Term Memory in Normals and Retardates 56
John A. McLaughlin and Beth Stephens, Temple University

The Utilization of an Interactive Unit in the Teaching of Arithmetic to Handicapped Children 69

The Verbal Information Processing of Educable Mentally Retarded Children on Quantitative Verbal Problems 74
G.P. Thibodeau, University of Connecticut

Application of Learning Theory to the Evaluation of Language Development in Young Retarded Children 80
Mack L. Bowen, Illinois State University

Use of a Music Activity and Social Reinforcement to Increase Group Attending Behavior 86
Helen A. Jorgenson, Cleveland Music School Settlement

The First Year of the Down's Syndrome Preschool Program: Objectives, Procedures, and Results 95
Valentine Dmitriev, University of Washington

The Pinkard Court School Program 110
William P. Johnson, Pinkard Court Special Education School, Roanoke County, Virginia

We Teach Them Everything 115
Louise H. Wade, Pinkard Court Special Education School, Roanoke County, Virginia

Music: An Aid to Learning for TMR's 119
Betty Joe Harris, Pinkard Court Special Education School,
Roanoke County, Virginia

The Para-Professional in the TMR Classroom 123
Lois H. Taliaferro, Pinkard Court Special Education School,
Roanoke County, Virginia

A COMPARISON OF THE DEVELOPMENT OF REASONING IN NORMALS AND RETARDATES

Susan J. Robb Beth Stephens
Temple University

DESCRIPTION OF VARIABLES

Following Piaget's and Inhelder's approach (1968) to the diagnosis of reasoning in the retarded, experiments previously used by her were chosen for the present study. These assessments included 10 conservation tasks (substance, weight, length - displaced rods, length - rod sections, liquids, dissolution of sugar, dissociation of notions of weight and volume, one-for-one exchange, and term-to-term correspondence).

Let me demonstrate the conservation of substance task, as it is one of the most basic. The child is asked to equalise two balls of clay so that they contain the same amount. The examiner then rolls one ball into a "hot dog", or has the child do it. Then the examiner asks whether the two pieces still have the same amount, or is one more or less than the other? After he answers, the child is asked how he knows this is so. The "hot dog" is then transformed into a "pancake", and finally into about a dozen little pieces. Each time the child is called upon to compare one of the original balls with that which has been altered. If he has acquired what Piaget calls "reversibility" in his thought processes, the child is able to reverse in his mind the transformation of the one ball and think back to the beginning when the two balls were identical. He then moves forward again, realizing that clay was neither added nor taken away, and that the two balls are still, in fact, the same amount. This is conservation of substance.

This investigation was supported in part by Research Grant #15-P-55121/3-02 (formerly #RD-2382-P) from the Division of Research and Demonstration Grants, Social Rehabilitation Service, Department of Health, Education, and Welfare, Washington, D. C., 20201.

The dissolution of sugar task assesses the child's understanding of the constancy of substance, weight, and volume despite a change in form. Briefly, after establishing on a balance scale that two small beakers are equal in amount of water and weight, and that two sugar cubes also weigh the same, the examiner moves in with a series of questions and probes each response to uncover the child's underlying reasoning: What happens when one sugar cube is dropped into one of the cups? What does it mean to "melt" or "dissolve"? Will the beaker with the sugar weigh the same, more, or less than before? Is there still sugar in the water after it melts and can no longer be seen? Is there as much sugar in the cup as was in the lump? Do the two beakers now weigh the same? And did the water level change at all when the sugar cube was added?

A second type of task concerns logic and classification (class inclusion - animals, class inclusion - beads, changing criterion, intersection of classes, relationships - brothers and sisters, relationships - right and left). In the changing criterion task the child is given an assortment of cardboard cut-outs and instructed to group like pieces together. There are six each of large and small, red and blue, circles and squares. He is then given three opportunities to divide the lot into just two piles, grouping similar pieces together. The task determines his flexibility in selecting criteria for classification.

A third type of task encompasses operativity and symbolic imagery (rotation of squares, rotation of beads, transfer from two to three dimensions, changing perspectives, both mobile and stationary). For example, to assess the child's capacity to assume a perspective other than his own, he is seated opposite the examiner and asked to move around a table on which are arranged a cardboard tower and house and a model tree. Stopping at each of eight positions, he is asked to select the drawing, from a set of eight drawings, which portrays what the examiner, or a small doll he holds, would see from where he stands, not what the child himself sees, and to explain how he knew it was the proper view. Following this, the process is reversed. From a stationary position, the subject is shown each drawing and asked where someone must stand in order to see the "village" that way and make such a drawing.

A final task, combination of liquids, is at the level of formal operations, and calls for abstract thought.

SCORING PROCEDURES

Two types of scores were assigned to the assessments. All reasoning tasks were first awarded a dichotomous, pass-fail score. Then we wanted to what thought processes the children used to get their answers, so we asked: Why? How do you know? and pursued it with each child until his level of operation seemed clear. The responses on classification and conservation problems were then scored on a one-to-nine point scale.

In addition to the above battery, scores were also obtained on sub-tests of the Wechsler, and each subject was administered the appropriate level of the Wide Range Achievement Test, which measures spelling, reading, and arithmetic ability.

PHASE I - INITIAL TWO YEARS OF STUDY

Because reasoning scores were available from three age groups: 6-10, 10-14, and 14-18, of both normal and retarded subjects, it was possible to accomplish cross-sectional analyses of data which indicated developmental trends and which compared the performance of normals and retardates. Our findings were:

1. Developmental trends across age groups were observed in the reasoning of normals. With the exception of skill in hierarchical class inclusion and of ability in multiple criteria (which were not found even in the 14-18 age group), classification tasks, which require concrete operations, were performed by normal subjects prior to their 14th year. Inability of the 14-18 age group to perform

classification tasks, generally regarded as tasks at the concrete level, and conservation of volume tasks, which require formal or abstract thought, was a serendipitous finding. Longitudinal research will determine if there is later acquisition of these abilities, or if these tasks require thought processes unavailable to persons in the 90-110 I.Q. range.

2. Like normals, the performance of retardates in the 6-10 and 10-14 age groups reflected developmental trends, but statistically significant development did not continue on 27 of the 29 reasoning tasks for the 14-18 age group. Whether the arrestation is permanent, or whether less accelerated growth continues over time, will be determined in subsequent phases of this study. Present findings do substantiate those of Inhelder (1968): no retardates achieved the level of formal thought operations.

3. Significant differences did occur between the performance of normals and retardates on 20 of the 29 reasoning tasks when mental and chronological age were held constant. Comparison of the two groups indicated the performance of retardates generally was characterized by insufficiencies in the grouping, the flexibility, and the reversibility required in concrete operational thought. The 50 to 75 I.Q. group encountered particular difficulty in tasks dealing with shifts in categorical sorting, an example of which was the changing criterion task with red and blue, large and smalle, circles and squares described above. The lack of significant differences between the two groups in the areas of spatial orientation and right-left relationships serves to question the relationships between these skills and other cognitive processes posited by workers who view success in these areas as basic to the remediation of learning disabilities.

PHASE II - THIRD AND FOURTH YEARS OF STUDY

Of central interest in the project is the longitudinal assessment of the development of reasoning in normals and retardates, both of whom generally showed significant gains. To this end, analysis of variance techniques were used in the comparison of Phase I and Phase II data. Results indicated:

1. There was no significant change on four of the 29 variables for normals because near maximum scores were obtained during both testing periods. Comprehension of conservation of volume appeared after the 18th year in normals. This is a task that required abstract reasoning about the probable displacement of water by two pieces of clay. However, older normals still lacked the flexibility of thought structures needed in a complex classification task involving the understanding of groups and sub-groups. Phase III may reveal further progress.

2. Retardates' performance improved to varying degrees on every task, with the exception of the same classification problem which gave difficulty to the normals. As anticipated from Phase I analyses, conservation of volume tasks remained essentially unsolvable by retardates, as did multiple-criteria classification. Over a two-year period between testings, the younger group, now 8-12, showed significant improvement on 22 of the 29 variables. The middle group, now 12-16, showed significant improvement on 18, whereas the older group, now 16-20, improved significantly on only eight, and maximum scores still were not attained. Development does, however, appear to continue.

Comparison of middle and older groups inPhase II showed little significant change, but comparison of the older group, 16-20 years of age, with the Phase I middle group, then 10-14 (a technique known as "cross-lagging"), revealed greater gains in the additional two years' growth time. This suggests a slackened tempo rather than a halt in the development of older retardates.

3. Analysis of covariance, with mental and chronological age held constant, showed slightly less significant difference between normals' and retardates' scores in Phase II, due to the achievement by retardates of some of the simpler tasks of the concrete operations period (one-for-one exchange, rotation of beads, intersection of classes).

SUMMARY

We would like to summarize three major findings derived from comparison of performance during Phases I and II for three age groups of normal and retarded subjects in the study:

1. The inability of normals, ages 14 to 18, to perform successfully on certain Phase I tasks which involved formal operations suggested that perhaps normals, I.Q. 90-110, did not achieve this level of thought. However, improved scores were obtained two years later for the same group on the same measures. Development which promotes acquisition of formal thought process appears to continue beyond the 18th year in persons of average intelligence.

2. Lack of differences between the middle and older groups of retardates suggested possible arrestation of cognitive development in the older group. However, data provided during Phase II indicate development does proceed in retardates, ages 16-20, although at a decelerating tempo.

3. The differences obtained during Phase I between the thought processes of normals and retardates generally were maintained during Phase II: i.e., significant differences which are not accounted for by chronological or mental age do exist between the operational thought of normals and retardates. These differences appear to involve the categorization, the flexibility, and the reversibility required in tasks involving conservation and classification.

IMPLICATIONS

We would like to note some implications which the study suggests. A scoring system was devised for 29 Piagetian reasoning assessments, and inter-rater reliability was determined at the outset. Also, factorial validity of the measures was established. In addition, approximate ages were determined for the achievement of these reasoning tasks by normals and by retardates. It is now apparent that (1) Piaget's "operational thought" or "thought in action" is a process and product separate and distinct from the static storage of information defined by traditional tests of intelligence such as the Wechsler; (2) these "thought processes" are measurable; and (3) there are important differences in the reasoning processes of normals and retardates.

"Test validity" is a well-known term. "Training validity" is a concept we would seek to promote. Training programs can now be created that offer activities based on the reasoning factors identified in this study, activities commensurate with an individual's level of functioning. Present analyses indicate that retardates need to learn to think, to reason in concrete situations, to classify and re-classify information, to categorize and sub-categorize events and objects, and to achieve flexibility in their thought processes. These abilities are not acquired through drill and memorization of facts. Rather, they are acquired by interaction with the environment, by learning to reason in on-going situations.

Training in reasoning could draw from Copeland's (1970) application of Piagetian research to the teaching of mathematics and could be carried out in what Furth (1970) describes as a "thinking laboratory", a room equipped with concrete manipulative materials which are used to promote acquisition of concepts at the pre-operational and concrete operational levels. Additional guidelines are available from Furth's (1970) exercises in symbol-picture logic, and from methods outlined by Almy (1970) to promote logical thinking at the concrete level. Appropriate experiences include classification tasks which involve actual manipulation of objects and which emphasize grouping, sorting, and describing, like the changing criterion task already cited. In all instances, activities should be supplied which are sufficiently in advance of the subject's present level of functioning to be motivating, but not so far in advance as to be frustrating. Through interview techniques, evaluation could be made of the subject's ability to utilize the learning opportunity.

Present demonstration of the continuing development of logical reasoning in retardates through their 20th year substantiates their need for continuing education. Although retardates achieve more slowly than normals, public education traditionally ends at 18 for both groups. Present findings indicate that in many instances retardates do not acquire the thought structures required of concrete logical thought until late adolescence. Therefore, education and habilitation programs which include training in reasoning should be provided retardates until and beyond age 20. Adult evening classes could furnish extended training in structured situations, at the same time filling leisure time voids.

Some questions remain unanswered. Additional longitudinal data are needed to determine the extent of this continuing growth period of young adult retardates. Also, there is need to determine if retardates who showed no increases in development over the two-year period are fixated at this level, or if development is reactivated at a later age. There is, in addition, substantial interest in retardates who demonstrate deterioration in reasoning. Deterioration is counter to the hierarchical stages of reasoning posited by Piaget. If the deterioration continues, is it general or confined to specific areas? Further, does this regression proceed in inverse ordering of the hierarchical stages of cognitive development?

The results of our study have implications for normals as well as for retardates. Although their reasoning abilities do continue to develop, not all subjects, ages 16-20 in the 90-100 I.Q. range, achieved formal or abstract thought. Training programs or jobs which require abstract thought in persons who are not functioning at this level are failure-oriented. Rehabilitation programs which involve high school drop-outs and other disenchanted youth should provide individual assessment of reasoning to determine whether a person in this "normal" range of intelligence is capable of abstract thought, and whether the ability is specific or generalizes to a variety of situations. Traditional junior and senior high school mathematics programs, for example, require abstract thought, but neglect to determine whether or not these logical thought processes are available to the pupils who are required to participate. In most instances, programs for these persons should be oriented toward the development of abstract thinking through inductive discovery and concrete reasoning first, rather than assuming its presence.

Phase III data should help to clarify the strength and longevity of trends already seen in Phases I and II, and to deepen our understanding of reasoning skill acquisition by both normals and retardates. With these insights we may better serve their education and training needs in programs geared to their specifically assessed abilities.

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TABLE 1

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR NORMALS - PHASE I (N=75) AND PHASE II (N=75)

VARIABLES	PHASE I		PHASE II			
	$\bar{X}$	SD	$\bar{X}$	SD	F RATIO	Ceiling Scores
1. Conservation of Substance	17.40	5.64	20.72	.91	26.02**	21
2. One for One Exchange	11.47	1.52	11.91	.34	6.45*	12
3. Dissolution of Sugar (Wt)	8.91	4.14	9.65	3.74	.93	12
4. Dissolution of Sugar (Sub)	8.76	3.25	10.07	2.09	8.58**	12
5. Dissolution of Sugar (Vol)	3.72	2.25	4.91	3.06	6.54*	9
6. Conservation of Weight	16.73	5.99	20.24	2.91	22.88**	21
7. Term to Term Correspondence	25.13	4.44	27.49	1.21	19.72**	28
8. Class Inclusion-Animals (3)	16.85	5.40	20.28	4.60	17.48**	24
9. Class Inclusion-Animals (4a)	24.01	9.60	30.11	8.43	17.06**	36
10. Class Inclusion-Animals (5a)	1.85	1.84	2.57	2.18	4.78*	6
11. Class Inclusion-Animals (5b)	3.20	2.41	4.55	2.10	13.34**	6
12. Conservation of Volume (1-3)	14.57	6.04	18.80	7.66	14.10**	27
13. Conservation of Volume (4)	10.93	11.25	18.15	15.07	11.03**	36
14. Rotation of Beads	22.80	3.84	22.97	3.18	.09	25
15. Conservation of Length	17.39	6.17	20.37	2.51	15.10**	21
16. Conservation of Length-Rods	18.36	5.19	20.72	1.11	14.68**	21
17. Changing Criterion-Total	2.49	.74	2.83	.45	11.11**	3
18. Conservation of Liquid	18.90	3.98	20.83	.83	17.40**	21
19. Class Inclusion-Beads-Total	3.37	1.31	3.85	.67	7.95**	4
20. Dissociation of Weight and Volume	35.33	16.30	48.36	21.48	17.18**	72
21. Intersection of Classes	20.84	5.14	22.08	4.71	2.37	24
22. Rotation of Squares (1)	2.68	1.48	3.77	1.52	19.90**	6
23. Rotation of Squares (2)	3.73	1.66	4.64	1.50	12.40**	6
24. Transfer from Two to Three Dimensions	8.00	1.22	11.36	1.71	191.45**	16
25. Changing Perspectives-Mobile	24.68	11.78	33.15	8.93	24.61**	40
26. Changing Perspectives-Stationary	31.37	11.02	35.35	7.68	6.56*	40
27. Chemistry	2.72	.88	3.36	.78	22.20**	4
28. Relationships-Brothers and Sisters	2.60	.85	2.77	.63	2.00	3
29. Relationships-Right and Left	4.76	1.57	5.56	.99	13.98**	6

*p $<$.05; **p $<$.01

TABLE 2

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES
FOR RETARDATES - PHASE I (N=75) AND PHASE II (N=75)

VARIABLES	PHASE I $\bar{X}$	PHASE I SD	PHASE II $\bar{X}$	PHASE II SD	F RATIO	Ceiling Score
1. Conservation of Substance	6.59	6.46	11.72	8.09	18.44**	21
2. One for One Exchange	7.33	3.73	9.69	2.80	19.24**	12
3. Dissolution of Sugar (Wt)	5.29	3.69	6.91	3.86	7.66**	12
4. Dissolution of Sugar (Sub)	4.40	2.58	6.28	2.92	17.47**	12
5. Dissoultion of Sugar (Vol)	2.24	1.66	2.67	1.96	2.07	9
6. Conservation of Weight	7.00	6.70	11.45	7.95	13.37**	21
7. Term to Term Correspondence	16.29	7.42	21.47	6.43	20.83**	28
8. Class Inclusion-Animals (3)	11.21	5.32	14.97	5.22	19.09**	24
9. Class Inclusion-Animals (4a)	12.01	6.57	18.39	7.60	30.19**	36
10. Class Inclusion-Animals (5a)	1.04	.20	1.13	.70	2.12	6
11. Class Inclusion-Animals (5b)	1.63	1.42	2.71	1.92	15.37**	6
12. Conservation of Volume (1-3)	6.64	5.66	8.48	5.47	4.10*	27
13. Conservation of Volume (4)	4.20	.96	5.19	4.37	3.65	36
14. Rotation of Beads	14.55	7.10	19.25	5.10	20.56**	25
15. Conservation of Length	7.97	6.84	11.16	7.61	7.27**	21
16. Conervation of Length-Rods	9.79	6.67	14.68	7.69	15.23**	21
17. Changing Criterion-Total	1.39	.77	1.72	.86	6.24*	3
18. Conservation of Liquid	10.16	7.83	13.27	8.09	5.72*	21
19. Class Inclusion-Beads-Total	1.05	1.48	1.79	1.82	7.35**	4
20. Dissociation of Weight and Volume	15.89	7.86	21.76	9.57	16.91**	72
21. Intersection of Classes	16.36	5.41	19.55	5.40	13.02**	24
22. Rotation of Squares (1)	1.03	1.23	1.91	1.56	14.70**	6
23. Rotation of Squares (2)	2.37	1.59	3.27	1.74	10.75**	6
24. Transfer from Two to Three Dimensions	6.09	1.85	7.21	2.52	9.66**	16
25. Changing Perspectives-Mobile	11.87	5.50	17.35	8.61	21.57**	40
26. Changing Perspectives-Stationary	13.25	7.48	19.80	8.85	23.94**	40
27. Chemistry	1.64	.61	2.27	.55	43.64**	4
28. Relationships-Brothers and Sisters	.99	1.10	1.65	1.16	13.12**	3
29. Relationships-Right and Left	2.81	1.58	4.04	1.75	20.26**	6

*$p < .05$; **$p < .01$

TABLE 3

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR NORMALS - PHASE I (6-10) AND PHASE II (8-12)

	PHASE I		PHASE II			
VARIABLES	$\overline{X}$	SD	$\overline{X}$	SD	F RATIO	Ceiling Score
1. Conservation of Substance	13.04	7.91	20.92	.40	24.76**	21
2. One for One Exchange	10.56	2.36	11.80	.50	6.58*	12
3. Dissolution of Sugar (Wt)	7.12	4.23	8.04	3.95	.63	12
4. Dissolution of Sugar (Sub)	6.08	3.38	8.64	2.56	9.11**	12
5. Dissolution of Sugar (Vol)	2.60	1.94	3.76	2.98	2.67	9
6. Conservation of Weight	13.20	7.70	20.28	2.49	19.12**	21
7. Term to Term Correspondence	22.56	6.55	27.56	1.12	14.15**	28
8. Class Inclusion-Animals (3)	12.36	4.50	18.44	5.01	20.39**	24
9. Class Inclusion-Animals (4a)	17.72	8.59	26.88	9.37	12.99**	36
10. Class Inclusion-Animals (5a)	1.04	.20	2.40	2.00	11.45**	6
11. Class Inclusion-Animals (5b)	2.36	2.23	4.00	2.20	6.85*	6
12. Conservation of Volume (1-3)	12.20	7.72	14.80	6.14	1.74	27
13. Conservation of Volume (4)	8.24	9.40	10.24	12.06	.43	36
14. Rotation of Beads	20.96	5.25	22.56	3.54	1.60	25
15. Conservation of Length	11.72	7.93	19.48	4.16	18.79**	21
16. Conservation of Length-Rods	14.32	7.44	20.40	1.76	15.80**	21
17. Changing Criterion-Total	1.92	.86	2.52	.65	7.69**	3
18. Conservation of Liquid	16.64	5.99	20.56	1.36	10.20**	21
19. Class Inclusion-Beads-Total	2.52	1.81	3.56	1.12	5.99*	4
20. Dissociation of Weight and Volume	28.52	14.07	34.40	18.79	1.57	72
21. Intersection of Classes	19.84	5.50	20.88	5.47	.45	24
22. Rotation of Squares (1)	1.72	1.40	2.80	1.53	6.79*	6
23. Rotation of Squares (2)	2.44	1.19	3.72	1.51	11.02**	6
24. Transfer from Two to Three Dimensions	7.72	1.28	10.04	2.21	20.70**	16
25. Changing Perspectives-Mobilé	15.04	8.14	27.16	11.48	18.55**	40
26. Changing Perspectives-Stationary	21.32	9.11	30.32	9.95	11.13**	40
27. Chemistry	2.20	.58	2.80	.82	9.00**	4
28. Relationships-Brothers and Sisters	2.20	1.16	2.72	.68	3.77	3
29. Relationships-Right and Left	3.36	1.68	4.84	1.41	11.42**	6

*p $<$ .05; **p $<$ .01

TABLE 4

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR NORMALS - PHASE I (10-14) AND PHASE II (12-16)

	PHASE I		PHASE II			
VARIABLES	$\bar{X}$	SD	$\bar{X}$	SD	F RATIO	Ceiling Score
1. Conservation of Substance	19.36	2.06	20.56	1.33	6.00*	21
2. One for One Exchange	11.80	.41	11.92	.28	1.48	12
3. Dissolution of Sugar (Wt)	9.60	4.04	9.80	3.85	.03	12
4. Dissolution of Sugar (Sub)	9.72	2.51	10.40	1.61	1.30	12
5. Dissolution of Sugar (Vol)	3.84	2.39	5.12	2.86	2.94	9
6. Conservation of Weight	18.68	4.13	20.28	3.60	2.13	21
7. Term to Term Correspondence	26.44	2.24	27.28	1.46	2.47	28
8. Class Inclusion-Animals (3)	19.56	4.34	22.24	2.42	7.27**	24
9. Class Inclusion-Animals (4a)	26.40	9.13	33.92	4.31	13.87**	36
10. Class Inclusion-Animals (5a)	1.88	1.88	2.80	2.45	2.22	6
11. Class Inclusion-Animals (5b)	3.64	2.43	5.32	1.65	8.17**	6
12. Conservation of Volume (1-3)	14.24	4.09	18.68	7.70	6.49*	27
13. Conservation of Volume (4)	8.12	7.61	16.68	14.50	6.83*	36
14. Rotation of Beads	23.88	2.19	23.48	2.92	.30	25
15. Conservation of Length	20.36	1.29	20.96	.20	5.31*	21
16. Conservation of Length-Rods	20.72	.68	21.00	.00	4.26*	21
17. Changing Criterion-Total	2.76	.52	2.96	.20	3.19	3
18. Conservation of Liquid	20.04	1.95	21.00	.00	6.08*	21
19. Class Inclusion-Beads-Total	3.64	.91	4.00	.00	3.94	4
20. Dissociation of Weight and Volume	32.40	10.97	49.76	18.99	15.67**	72
21. Intersection of Classes	21.80	4.64	22.16	5.09	.07	24
22. Rotation of Squares (1)	2.72	1.24	4.04	1.21	14.52**	6
23. Rotation of Squares (2)	4.08	1.58	5.24	1.30	8.04**	6
24. Transfer from Two to Three Dimensions	7.60	1.16	11.92	.70	255.42**	16
25. Changing Perspectives-Mobile	22.96	7.80	34.28	5.86	33.69**	40
26. Changing Perspectives-Stationary	32.00	7.98	36.76	5.46	6.06*	40
27. Chemistry	2.60	.76	3.48	.71	17.71**	4
28. Relationships-Brothers and Sisters	2.68	.69	2.60	.82	.14	3
29. Relationships-Right and Left	5.08	1.12	5.88	.44	11.14	6

*$p < .05$; **$p < .01$

TABLE 5

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR NORMALS - PHASE I (14-18) AND PHASE II (16-20)

VARIABLES	PHASE I $\overline{X}$	PHASE I SD	PHASE II $\overline{X}$	PHASE II SD	F RATIO	Ceiling Score
1. Conservation of Substance	19.68	1.35	20.68	.75	10.55**	21
2. One for One Exchange	12.00	.00	12.00	.00	.00	12
3. Dissolution of Sugar (Wt)	10.40	3.29	11.12	2.76	.70	12
4. Dissolution of Sugar (Sub)	10.48	1.83	11.16	.90	2.79	12
5. Dissolution of Sugar (Vol)	4.92	1.80	5.84	3.08	1.66	9
6. Conservation of Weight	17.68	4.43	20.16	2.63	5.80*	21
7. Term to Term Correspondence	26.40	1.58	27.64	1.04	10.76**	28
8. Class Inclusion-Animals (3)	18.64	4.36	20.16	5.18	1.26	24
9. Class Inclusion-Animals (4a)	27.92	8.01	29.52	9.29	.43	36
10. Class Inclusion-Animals (5a)	2.64	2.36	2.52	2.12	.04	6
11. Class Inclusion-Animals (5b)	3.60	2.42	4.32	2.25	1.19	6
12. Conservation of Volume (1-3)	17.28	4.74	22.92	7.03	11.07**	27
13. Conservation of Volume (4)	16.44	14.02	27.52	13.63	8.03**	36
14. Rotation of Beads	23.56	2.80	22.88	3.10	.66	25
15. Conservation of Length	20.08	1.58	20.68	.90	2.73	21
16. Conservation of Length-Rods	20.08	1.12	20.76	.72	6.54*	21
17. Changing Criterion-Total	2.80	.41	3.00	.00	6.00*	3
18. Conservation of Liquid	19.92	1.26	20.92	.40	14.40**	21
19. Class Inclusion-Beads-Total	3.96	.20	4.00	.00	1.00	4
20. Dissociation of Weight and Volume	45.52	18.08	60.92	18.43	8.90**	72
21. Intersection of Classes	20.88	5.26	23.20	3.12	3.59	24
22. Rotation of Squares (1)	3.60	1.19	4.48	1.33	6.09*	6
23. Rotation of Squares (2)	4.68	1.31	4.96	1.24	.60	6
24. Transfer from Two to Three Dimensions	8.68	.95	12.12	.97	161.07**	16
25. Changing Perspectives-Mobile	36.04	8.14	38.00	4.07	1.16	40
26. Changing Perspectives-Stationary	40.80	5.44	38.96	3.32	2.08	40
27. Chemistry	3.36	.86	3.80	.41	5.34*	4
28. Relationships-Brothers and Sisters	2.92	.40	3.00	.00	1.00	3
29. Relationships-Right and Left	5.84	.37	5.96	.20	2.00	6

*$p < .05$; **$p < .01$

TABLE 6

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR RETARDATES - PHASE I (6-10) AND PHASE II (8-12)

VARIABLES	PHASE I $\overline{X}$	PHASE I SD	PHASE II $\overline{X}$	PHASE II SD	F RATIO	Ceiling Score
1. Conservation of Substance	3.00	.00	6.52	6.32	7.76**	21
2. One for One Exchange	4.52	3.06	7.80	3.24	13.55**	12
3. Dissolution of Sugar (Wt)	3.56	2.79	5.96	3.68	6.76*	12
4. Dissolution of Sugar (Sub)	3.00	1.94	5.00	2.48	10.08**	12
5. Dissolution of Sugar (Vol)	1.68	1.31	2.00	1.68	.56	9
6. Conservation of Weight	3.00	.00	6.92	6.40	9.39**	21
7. Term to Term Correspondence	11.32	6.12	17.08	7.01	9.58**	28
8. Class Inclusion-Animals (3)	8.72	5.35	13.48	5.03	10.93**	24
9. Class Inclusion-Animals (4a)	8.68	5.34	16.08	5.52	23.18**	36
10. Class Inclusion-Animals (5a)	1.00	.00	1.00	.00	.00	6
11. Class Inclusion-Animals (5b)	1.32	1.15	2.48	1.58	8.81**	6
12. Conservation of Volume (1-3)	3.08	.40	4.96	3.48	7.19**	27
13. Conservation of Volume (4)	4.44	1.50	4.56	1.42	.08	36
14. Rotation of Beads	10.56	5.68	17.12	5.73	16.54**	25
15. Conservation of Length	5.12	4.29	6.64	6.34	.99	21
16. Conservation of Length-Rods	5.32	5.18	10.12	7.89	6.47*	21
17. Changing Criterion-Total	.92	.70	1.28	.89	2.52	3
18. Conservation of Liquid	4.68	4.38	7.44	6.70	2.98	21
19. Class Inclusion-Beads-Total	.28	.54	.80	1.35	3.18	4
20. Dissociation of Weight and Volume	11.28	6.09	17.60	6.22	13.19**	72
21. Intersection of Classes	15.56	4.30	20.08	4.46	13.30**	24
22. Rotation of Squares (1)	.40	.71	1.04	1.17	5.47*	6
23. Rotation of Squares (2)	1.56	1.64	2.64	1.71	5.23*	6
24. Transfer from Two to Three Dimensions	4.48	.96	5.80	1.83	10.23**	16
25. Changing Perspectives-Mobile	9.80	3.85	14.16	5.67	10.12**	40
26. Changing Perspectives-Stationary	8.32	1.11	14.56	6.63	21.56**	40
27. Chemistry	1.16	.47	1.96	.54	31.17**	4
28. Relationships-Brothers and Sisters	.16	.37	1.20	1.16	18.35**	3
29. Relationships-Right and Left	1.88	1.20	3.24	1.76	10.16**	6

$*p < .05$; $**p < .01$

TABLE 7

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR RETARDATES - PHASE I (10-14) AND PHASE II (12-16)

	PHASE I		PHASE II			
VARIABLES	$\bar{X}$	SD	$\bar{X}$	SD	F RATIO	Ceiling Score
1. Conservation of Substance	7.44	6.06	14.88	7.38	15.19**	21
2. One for One Exchange	8.52	3.14	11.08	1.29	14.24**	12
3. Dissolution of Sugar (Wt)	5.28	3.54	6.76	3.77	2.05	12
4. Dissolution of Sugar (Sub)	4.68	2.39	6.84	2.72	8.89**	12
5. Dissolution of Sugar (Vol)	2.36	1.73	2.96	1.97	1.31	9
6. Conservation of Weight	6.52	6.53	13.68	7.53	12.92**	21
7. Term to Term Correspondence	17.84	6.77	23.88	4.98	12.91**	28
8. Class Inclusion-Animals (3)	12.24	5.29	15.32	5.40	4.15*	24
9. Class Inclusion-Animals (4a)	13.24	5.76	18.64	7.16	8.63**	36
10. Class Inclusion-Animals (5a)	1.04	.20	1.08	.40	1.00	6
11. Class Inclusion-Animals (5b)	1.12	.44	2.92	2.00	19.35**	6
12. Conservation of Volume (1-3)	7.68	6.23	9.40	3.85	1.38	27
13. Conservation of Volume (4)	4.20	.65	5.24	4.29	1.43	36
14. Rotation of Beads	17.08	6.08	20.80	3.56	6.97*	25
15. Conservation of Length	7.60	6.80	12.36	7.30	5.70*	21
16. Conservation of Length-Rods	10.56	7.57	17.84	5.81	14.55**	21
17. Changing Criterion-Total	1.56	.77	1.88	.73	2.29	3
18. Conservation of Liquid	13.40	7.70	16.64	6.51	2.58	21
19. Class Inclusion-Beads-Total	1.12	1.62	2.16	1.97	4.16*	4
20. Dissociation of Weight and Volume	19.36	7.11	21.00	4.18	1.04	72
21. Intersection of Classes	16.28	5.77	18.32	6.14	1.47	24
22. Rotation of Squares (1)	1.32	.99	2.52	1.58	10.33**	6
23. Rotation of Squares (2)	2.48	1.36	3.96	1.65	12.04**	6
24. Transfer from Two to Three Dimensions	7.32	1.15	7.88	2.65	.94	16
25. Changing Perspectives-Mobile	12.28	4.90	19.16	8.36	12.61**	40
26. Changing Perspectives-Stationary	15.28	6.44	22.96	7.68	14.68**	40
27. Chemistry	1.80	.58	2.56	.51	24.48**	4
28. Relationships-Brothers and Sisters	1.20	1.08	1.76	1.09	3.33	3
29. Relationships-Right and Left	3.00	1.41	4.44	1.56	11.72**	6

$*p < .05$; $**p < .01$

TABLE 8

ANALYSIS OF VARIANCE OF REASONING POINT SCALE SCORES FOR RETARDATES - PHASE I (14-18) AND PHASE II (16-20)

	PHASE I		PHASE II			
VARIABLES	$\bar{X}$	SD	$\bar{X}$	SD	F RATIO	Ceiling Score
1. Conservation of Substance	9.32	8.38	13.76	8.03	3.76	21
2. One for One Exchange	8.96	3.35	10.20	2.43	2.25	12
3. Dissolution of Sugar (Wt)	6.76	4.05	8.00	3.99	1.19	12
4. Dissolution of Sugar (Sub)	5.52	2.77	7.00	3.18	3.08	12
5. Dissolution of Sugar (Vol)	2.68	1.80	3.04	2.11	.42	9
6. Conservation Weight	11.48	7.62	13.76	8.08	.91	21
7. Term to Term Correspondence	19.72	6.77	23.44	4.84	4.99*	28
8. Class Inclusion-Animals (3)	12.68	4.79	16.12	5.07	6.08*	24
9. Class Inclusion-Animals (4a)	14.12	7.31	20.44	9.30	7.14*	36
10. Class Inclusion-Animals (5a)	1.12	.33	1.32	1.15	1.45	6
11. Class Inclusion-Animals (5b)	2.44	1.92	2.72	2.17	.23	6
12. Conservation of Volume (1-3)	9.16	6.23	11.08	6.66	1.11	27
13. Conservation of Volume (4)	3.96	.20	5.76	6.14	2.15	36
14. Rotation of Beads	16.88	6.41	19.84	5.20	3.21	25
15. Conservation of Length	11.20	7.77	14.48	7.12	2.42	21
16. Conservation of Length-Rods	13.48	7.84	16.08	7.24	1.48	21
17. Changing Criterion-Total	1.68	.63	2.00	.82	2.42	3
18. Conservation of Liquid	12.40	7.94	15.72	7.80	2.23	21
19. Class Inclusion-Beads-Total	1.76	1.64	2.40	1.71	1.83	4
20. Dissociation of Weight and Volume	17.04	8.18	26.68	13.51	9.32**	72
21. Intersection of Classes	17.24	6.09	20.24	5.48	3.35	24
22. Rotation of Squares (1)	1.36	1.60	2.16	1.55	3.22	6
23. Rotation of Squares (2)	3.08	1.44	3.20	1.68	.07	6
24. Transfer from Two to Three Dimension	6.48	1.96	7.96	2.46	5.54*	16
25. Changing Perspectives-Mobile	13.52	6.84	18.72	10.53	4.29*	40
26. Changing Perspectives-Stationary	16.16	9.57	21.88	9.75	4.38*	40
27. Chemistry	1.96	.45	2.28	.46	6.14*	4
28. Relationships-Brothers and Sisters	1.60	1.12	2.00	1.12	1.60	3
29. Relationships-Right and Left	3.56	1.66	4.44	1.71	3.41	6

*$p < .05$; **$p < .01$

TABLE 9

ANALYSES OF VARIANCE FOR REASONING POINT SCALE SCORES FOR RETARDATES - PHASE I (10-14) and PHASE II (16-20)

	VARIABLES	PHASE I (N=25) $\bar{X}$	SD	PHASE II (N=25) $\bar{X}$	SD	F RATIO
1.	Conservation of Substance	7.44	6.06	13.76	8.03	9.88**
2.	One-for-One Exchange	8.52	3.74	10.20	2.43	4.48*
3.	Dissolution of Sugar (Wt)	5.28	3.54	8.00	3.99	6.50*
4.	Dissolution of Sugar (Sub)	4.68	2.39	7.00	3.18	8.51**
5.	Dissolution of Sugar (Vol)	2.36	1.73	3.04	2.11	1.55
6.	Conservation of Weight	6.52	6.53	13.76	8.08	12.15**
7.	Term-to-term Correspondence	17.84	6.77	23.44	4.84	11.31**
8.	Class Inclusion - Animals (3)	12.24	5.29	16.12	5.07	7.01*
9.	Class Inclusion - Animals (4a)	13.24	5.76	20.44	9.30	10.83**
10.	Class Inclusion - Animals (5a)	1.04	.20	1.32	1.15	1.95
11.	Class Inclusion - Animals (5b)	1.12	.44	2.72	2.17	13.05**
12.	Conservation of Volume (1-3)	7.68	6.23	11.08	6.66	3.48
13.	Conservation of Volume (4)	4.20	.65	5.76	6.14	1.60
14.	Rotation of Beads	17.08	6.08	19.84	5.20	2.97
15.	Conservation of Length	7.60	6.80	14.48	7.12	12.22**
16.	Conservation of Length - Rods	10.56	7.57	16.08	7.24	6.95*
17.	Changing Criterion - Total	1.56	.77	2.00	.82	3.85
18.	Conservation of Liquid	13.40	7.70	15.72	7.80	1.12
19.	Class Inclusion - Beads - Total	1.12	1.62	2.40	1.71	7.41**
20.	Dissociation of Weight & Volume	19.36	7.11	26.68	13.51	5.81*
21.	Intersection of Classes	16.28	5.77	20.24	5.48	6.19*
22.	Rotation of Squares (1)	1.32	.99	2.16	1.55	5.24*
23.	Rotation of Squares (2)	2.48	1.36	3.20	1.68	2.77
24.	Transfer from Two to Three Dimensions	7.32	1.15	7.96	2.46	1.39
25.	Changing Perspectives - Mobile	12.28	4.90	18.72	10.53	7.68**
26.	Changing Perspectives - Stationary	15.28	6.44	21.88	9.75	7.98**
27.	Chemistry	1.80	.58	2.28	.46	10.60**
28.	Relationships - Brothers and Sisters	1.20	1.08	2.00	1.12	6.62*
29.	Relationships - Right & Left	3.00	1.41	4.44	1.71	10.53**

*$p < .05$; **$p < .01$

TABLE 10

ANALYSES OF COVARIANCE FOR REASONING POINT SCALE SCORES
WITH MENTAL AGE AND CHRONOLOGICAL AGE HELD CONSTANT
FOR NORMALS AND RETARDATES+

VARIABLES	Source of Variation	MS	F Ratio	Adjusted Mean	
				N	R
1. Conservation of Substance	B. Grps.	284.51	9.47**	18.93	13.51
	W. Grps.	30.04			
2. One for One Exchange	B. Grps.	2.50	.71	11.05	10.55
	W. Grps.	3.53			
3. Dissolution of Sugar (Weight)	B. Grps.	3.89	.31	8.60	7.96
	W. Grps.	12.78			
4. Dissolution of Sugar (Substance)	B. Grps.	42.28	8.07**	9.22	7.13
	W. Grps.	5.24			
5. Dissolution of Sugar (Volume)	B. Grps.	1.94	.33	4.01	3.56
	W. Grps.	5.81			
6. Conservation of Weight	B. Grps.	287.57	8.49**	18.57	13.12
	W. Grps.	33.86			
7. Term to Term Correspondence	B. Grps.	124.77	6.37*	26.28	22.69
	W. Grps.	19.60			
8. Class Inclusion Animals (3)	B. Grps.	35.31	1.56	18.58	16.67
	W. Grps.	22.61			
9. Class Inclusion Animals (4a)	B. Grps.	368.93	6.15*	27.33	21.16
	W. Grps.	60.02			
10. Class Inclusion Animals (5a)	B. Grps.	2.69	1.05	2.12	1.59
	W. Grps.	2.57			
11. Class Inclusion Animals (5b)	B. Grps.	5.69	1.43	4.01	3.24
	W. Grps.	3.98			
12. Conservation of Volume (1-3)	B. Grps.	236.40	7.00**	16.11	11.17
	W. Grps.	33.79			
13. Conservation of Volume (4)	B. Grps.	63.09	.63	12.94	10.39
	W. Grps.	99.83			
14. Rotation of Beads	B. Grps.	.71	.04	21.25	20.98
	W. Grps.	16.98			
15. Conservation of Length	B. Grps.	381.30	13.27**	18.90	12.63
	W. Grps.	28.74			
16. Conservation of Length-Rods	B. Grps.	137.96	4.82*	19.59	15.81
	W. Grps.	28.61			
17. Changing Criterion Total	B. Grps.	2.10	5.52*	2.51	2.04
	W. Grps.	.38			
18. Conservation of Liquid	B. Grps.	164.00	5.54*	19.10	14.99
	W. Grps.	29.62			
19. Class Inclusion Beads-Total	B. Grps.	24.89	14.59**	3.62	2.02
	W. Grps.	1.71			
20. Dissociation of Weight and Volume	B. Grps.	1087.14	5.41*	40.36	29.76
	W. Grps.	200.81			
21. Intersection of Classes	B. Grps.	3.33	.14	20.52	21.11
	W. Grps.	24.49			

TABLE 10 (continued)

Variables	Source of Variation	MS	F Ratio	Adjusted Mean N	Adjusted Mean R
22. Rotation of Squares (1)	B. Grps.	.63	.34	2.97	2.71
	W. Grps.	1.87			
23. Rotation of Squares (2)	B. Grps.	.12	.05	4.01	3.90
	W. Grps.	2.44			
24. Transfer from Two to Three Dimensions	B. Grps.	44.11	11.98**	10.35	8.22
	W. Grps.	3.68			
25. Changing Perspectives-Mobile	B. Grps.	273.96	4.77*	27.91	22.59
	W. Grps.	57.46			
26. Changing Perspectives-Stationary	B. Grps.	451.82	8.82**	30.99	24.16
	W. Grps.	51.23			
27. Chemistry	B. Grps.	2.70	7.44**	3.08	2.55
	W. Grps.	.36			
28. Relationships-Brothers and Sisters	B. Grps.	3.22	3.99*	2.50	1.93
	W. Grps.	.81			
29. Relationships-Right & Left	B. Grps.	1.92	1.16	5.02	4.58
	W. Grps.	1.65			

+ df = 1 and 146
B. Grps. = Between Groups
W. Grps. = Within Groups
** = Significant at the .01 level
* = Significant at the .05 level

24

A COMPARISON OF THE DEVELOPMENT OF MORAL JUDGMENT IN NORMALS AND RETARDATES

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When Piaget viewed morality as a formative process, three phases were found to exist. In the first phase, moral constraint from adults leads to moral realism and a condition lacking moral freedom. During the second phase, rules and commands are interiorized; while in the third there is achievement of co-operation which leads to self-determination.

Research conducted by Kohlberg (1958) generally confirmed the developmental nature of moral judgment posited by Piaget (1962) and extended consideration to the development of moral thinking and choice in the adolescent period. However, Berkowitz (1964) stated that evidence for a common moral judgment factor at a particular age is not always present, and that age changes in maturity of moral judgment do not always conform to Piaget's expectations. Not only was there need for longitudinal work which would observe moral development characteristic of the specific individuals, there also was need to determine if retardates' views concerning moral judgment progressed over time in a manner comparable to that of normals. For this reason provision was made for a longitudinal study which would assess the development of moral judgment in normals and retardates at two-year intervals. Present discussion compares data obtained during Phase One with that obtained during Phase Two.

MORAL JUDGMENT VARIABLES

Measures ueed in the longitudinal research to assess the development of moral judgment include:

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1. Lying: After the subject provided a definition of the term 'lie', he was read a series of paired stories, each accompanied by a pertinent drawing. Then he decided which of the two trespasses related to the stories was the more serious.

2. Justice: (a) Justice - Retributive or reciprocal: Stories of a misdeed followed by two possible modes of punishment were read to the subject. After each story the subject then was asked to choose the fairest punishment, the harshest punishment, the one he himself would choose, and the one his parents might use.

   (b) Punishment - Expiatory and Reciprocal: After a story involving two types of punishment was read to the subject, he was required to judge which type would discourage further misdeeds.

   (c) Collective Responsibility: Stories were read to the subject which required him to make judgments concerning the justice of punishing an entire group for something one member had done. In some instances identity of the wrongdoer was unknown.

3. Clumsiness and Stealing (Intent vs Consequences): To determine if seriousness of a deed was judged in terms of intent of doer or consequences of the act, paired stories were read which required decision concerning gravity of an act.

4. Rules of the Game: Subject and experimenter engaged in an abbreviated game of bowling. The subject's ability to verbalize and follow through with the game's rules was noted. Several questions probed the child's conceptions of the origin, divinity, and heteronomy of rules.

SCORING

A three-point system devised by Kohlberg (1968) was used to score three measures of moral judgment (lying, justice, and clumsiness & stealing). The scale was comprised of the following intervals:

1. Fail: no response or a bizarre or irrelevant one.
2. Response which focuses on consequences of an act.
3. Response which focuses on intentions rather than consequences.

The following four-point scale was devised to measure moral judgment in terms of collective responsibility:

1. Punish everyone
2. Punish no-one, with no reason given
3. Punish only the guilty ones, but with no clear reason given
4. Punish only the guilty ones, with a clear reason given

Rules of the Game was scored on two three-point scales. The first measure pertained to knowledge of rules and was scored:

1. No knowledge of rules
2. Verbalizes rules, but does not follow them
3. Verbalizes and follows rules

The second section of Rules of the Game dealt with opinions concerning possible alteration of rules, and was scored:

1. Cannot change rules
2. Changes without reservation
3. Changes for mutual benefit

Inter-rater reliability coefficients on measures of moral judgment in Phase I ranged from .70 to 1.00.

PHASE I - INITIAL TWO YEARS OF STUDY

When differences between normals (N=75) and retardates (N=75) on measures of moral judgment were tested by analysis of variance techniques significant differences were found on all but two of the variables. Additional analyses of the data for normals shows that developmental trends generally were indicated; i.e., performance of the middle group tended to be superior to that of the younger group, and in turn the performance of the older group generally was superior to that of the middle one, but the superiority was not always statistically significant. A similar but surprisingly more consistent pattern of development was observed in the performance of retardates. Again developmental trends were noted on most variables. In instances in which they were not, the performance of the older group of retardates was equal to or less than that of the middle group although differences were not statistically significant. The question which arose in these instances was, "Do retardates become fixated in the development of moral judgment at the 14 to 18 age level?" Longitudinal data will provide an answer.

PHASE II - THIRD AND FOURTH YEARS OF STUDY

Differences between Phase I and Phase II scores for normals (N=75) and retardates (N=75) on moral judgment measures were tested by analysis of variance techniques. In both instances, a decrease in performance was noted on only three of the eleven variables. The lowered performance demonstrated by both groups on one Justice assessment could be attributed to revised wording of the story which was done in an effort to eliminate ambiguity. Why both groups should exhibit lowered performance on the second measure of Intent vs Consequence remains problematical, as does normals' lowered performance on the first Collective Responsibility story and retardates' lowered performance on the third set of Clumsiness and Stealing stories. Significant gains were noted for normals on six of the eleven measures. On two additional variables the group's near optimum performance precluded significant gains. Significant improvement in retardates' scores was noted on five variables; although increases were noted on three others, these were not significant.

Consistent growth across the three age groups of normals occurred in the ability to consider the intent versus the consequences in situations which involved lying. The only exception was a slight regression in scores on one variable by the 12-16 age group. In considering the justice of expiatory versus reciprocal punishment, increased insight was evidenced by each age group, and only in the 12-16 group did this increase fail to reach a significant level. Improved performance was noted in each of the three age groups for Clumsiness and Stealing I and Clumsiness and Stealing III. Again, opinions were elicited regarding situations in which consideration was addressed to intent versus consequences. On both variables, the 16-20 group achieved optimum performance. In some instances the improvement which occurred in one area of moral judgment was not maintained when opinions were solicited on another, but similar, situation. These oscillations occurred in the 8-12 and the 12-16 groups on the second measure of Clumsiness and Stealing and the first Collective Responsibility story, but in both instances performance appeared to stabilize in the 16-20 group as their performance reflected improvement as scores reached a near optimum level. When opinions involved judgments concerning the justice of punishing an entire group for something one member had done, increased insight occurred at each level.

Retardates of all three age groups demonstrated improved performance over time when opinions were elicited concerning expiatory versus reciprocal forms of punishment. Similar gains were recorded for the three age groups of retardates on the three decision-making tasks concerning accountability of an entire group for the misdeeds of one of its members. However, either continuing immaturity or regression was displayed in retardates' opinions of Intent vs Consequences in the three Clumsiness and Stealing measures. Third Wave data will determine if regression in this area continues.

Results of cross-sectional analyses carried out in Phase I of this study suggested a fixation in moral development for the older group of retardates on some measures. Efforts to assess this sequentially prompted an interphase analysis. A review of these data provides longitudinal evidence that retardates demonstrate consistent gains in the development of moral judgment concepts.

An interphase analysis of variance on measures termed Rules of the Game disclosed improved performance for all three age groups of normals and retardates on two of the three variables and stable performance on the third measure. The Rules of the Game assessments determine the relations that exist between awareness and practice of rules. All sub-groups of normals and retardates achieved the identical optimum or near-optimum scores in Phase II which were previously attained in Phase I on the first variable, Has Rules. This measure pertains to the ability to verbalize rules, and the high performance level on this variable by all sub-groups precluded appreciable improvement. The ability to follow through with the game's rules was assessed by the second variable, Follows Rules, and the younger retardates demonstrated significant improvement while the middle and older retardates and the three groups of normals exhibited improved, although not significantly improved, performance. The middle and older groups of normals performed at the ceiling level on this variable in Phase II. The third variable, Can Change Rules, deals with opinions concerning possible alteration of rules, and, in this instance, all the sub-groups of normals and retardates attained significant F-ratios. In both normals and retardates, the younger groups showed less growth than the other two-age groups on this particular variable.

DISCUSSION AND CONCLUSIONS

Scores for the three age groups of normal subjects generally reflected significant gains when performance during Phase I was compared with performance in Phase II.

Over the two-year period gains did accrue for retardates in moral judgment, but the increases were irregular. In some areas sporadic growth was interspersed with regression. There was particular difficulty in judging an act in terms of the intention of the doer rather than the material consequences of the act and in realizing that a group may be held responsible for the acts of one of its members. Findings suggest that retardates can profit from training in moral reasoning through childhood, adolescence, and young adulthood.

Training programs for normals should capitalize on the period which demonstrates the most rapid development both in verbalized and observed moral behavior; the years are six to 16. Programs for this age group would appropriately provide instruction in attitudes towards and understanding in such areas as rules, laws, honesty, and justice, as well as training in situations involving lying and/or truthfulness, stealing and/or honesty, dependability, persistency, and self-control and observance of rules.

The lack of sophistication evidenced by retardates in situations involving complex moral judgment indicates that assessment and intervention attempts should focus on fairly simple aspects of moral judgment: I.e., such concepts as intentionality, reciprocity, and fairness, rather than on the more abstract notions of law and social contract.

Suggestions for training programs may be taken from the procedures outlined below.

Attempts to promote growth in moral judgment draw from the approach formulated by Turiel (1966), one which is based on group discussion of situations concerning moral conflict. In this, the subject's stage of moral development is ascertained; then he is exposed through stories, role playing, film strips, etc., to concepts one stage in advance of his present level of functioning. At times the group leader would be approximately peer age, at times an older person, but in each instance the leader would be a person who functions at a higher level of moral judgment than remaining members. The arrangement would provide experience in resolving peer- versus adult-introduced conflicts, a method which proved beneficial in studies cited by Devereaux (1970). During discussion periods, effort would be made to have individuals in the group arrive at decisions or judgments at a level immediately in advance of their present one. Basically, the method derives from findings (Kohlberg, 1958) which suggest it is more realistic to expect a person to advance to the next higher level of moral judgment than to expect training to result in total achievement regardless of the individual's present performance level. Conflict situations would be derived from the trainee's immediate or future environment. Techniques should be used which provide experience in weighing values against each other and through this analysis critical judgment should be promoted. Verbal and pictorial situations devised by Bull (1970) could be adapted for training use. Discussions could be extended through film strips, role-playing (exposition of problems of personal relationship), personal involvement in practical government and service as well as through contrived experiences designed to promote moral awareness and understanding.

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TABLE 1

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES FOR NORMALS - PHASE I AND PHASE II

VARIABLES	Phase I (N=75) $\bar{X}$	SD	Phase II (N=75) $\bar{X}$	SD	F Ratio	Ceiling Score
1. Lying I	2.89	.42	2.92	.39	.15	3
2. Lying II	2.48	.91	2.73	.68	3.56	3
3. Lying III	2.39	.93	2.91	.34	21.84**	3
4. Justice I	2.52	.92	2.03	1.00	10.66**	3
5. Justice II	2.00	1.05	2.56	.83	16.35**	3
6. Clumsiness and Stealing I	1.96	1.01	2.81	.59	55.07**	3
7. Clumsiness and Stealing II	2.77	.61	2.28	.97	14.56**	3
8. Clumsiness and Stealing III	2.37	.93	2.81	.59	16.16**	3
9. Collective Responsibility I	3.84	.57	3.80	.59	.26	4
10. Collective Responsibility II	2.19	1.37	2.95	1.09	21.71**	4
11. Collective Responsibility III	3.32	1.10	3.83	.48	16.81**	4

* $p < .05$

** $p < .01$

TABLE 2

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES FOR RETARDATES - PHASE I AND PHASE II

Variables	Phase I (N=75)		Phase II (N=75)			
	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio	Ceiling Score
1. Lying I	2.21	.91	2.36	.80	2.01	3
2. Lying II	2.00	.87	2.13	.98	1.00	3
3. Lying III	1.96	.95	2.16	.85	2.18	3
4. Justice I	2.17	.86	1.75	.89	10.07**	3
5. Justice II	1.81	.91	2.27	.86	11.57**	3
6. Clumsiness and Stealing I	1.67	.88	1.95	.96	4.39*	3
7. Clumsiness and Stealing II	2.41	.74	1.31	.64	98.30**	3
8. Clumsiness and Stealing III	1.96	.96	1.75	.95	2.42	3
9. Collective Responsibility I	3.28	1.17	3.81	.67	14.80**	4
10. Collective Responsibility II	1.59	1.14	3.07	1.08	84.00**	4
11. Collective Responsibility III	2.67	1.20	3.20	1.00	9.71**	[illegible]

* $p < .05$

** $p < .01$

TABLE 3

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES FOR NORMALS - PHASE I (6-10) AND PHASE II (8-12)

VARIABLES	Phase I (N=25) $\bar{X}$	SD	Phase II (N=25) $\bar{X}$	SD	F Ratio	Ceiling Scores
1. Lying I	2.76	.66	2.76	.66	.00	3
2. Lying II	2.12	.93	2.52	.87	2.18	3
3. Lying III	1.80	1.00	2.76	.52	14.96**	3
4. Justice I	2.52	.87	2.28	.98	1.00	3
5. Justice II	1.76	.97	2.20	1.00	4.13*	3
6. Clumsiness and Stealing I	1.56	.92	2.60	.82	26.00**	3
7. Clumsiness and Stealing II	2.64	.70	1.80	1.00	11.33**	3
8. Clumsiness and Stealing III	1.84	.99	2.60	.82	11.34**	3
9. Collective Responsibility I	3.92	.40	3.80	.58	.68	4
10. Collective Responsibility II	1.40	1.00	2.32	1.07	11.08**	4
11. Collective Responsibility III	3.36	1.00	3.76	.52	4.80*	4

* $p < .05$

** $p < .01$

TABLE 4

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES FOR NORMALS - PHASE I (10-14) AND PHASE II (12-16)

Variables	Phase I (N=25)		Phase II (N=25)			
	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio	Ceiling Score
1. Lying I	2.92	.28	3.00	.00	2.09	3
2. Lying II	2.80	.82	2.68	.75	.27	3
3. Lying III	2.52	.87	2.96	.20	7.19**	3
4. Justice I	2.76	.88	1.76	.97	18.75**	3
5. Justice II	2.60	1.00	2.64	.76	.03	3
6. Clumsiness and Stealing I	1.64	.95	2.84	.55	36.00**	3
7. Clumsiness and Stealing II	2.84	.55	2.12	1.01	10.02**	3
8. Clumsiness and Stealing III	2.44	.92	2.84	.55	4.00	3
9. Collective Responsibility I	3.88	.60	3.68	.75	2.00	4
10. Collective Responsibility II	1.96	1.43	3.00	1.00	13.26**	4
11. Collective Responsibility III	2.84	1.43	3.80	.50	11.29**	4

* $p < .05$

** $p < .01$

TABLE 5

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES FOR NORMALS - PHASE I (14-18) AND PHASE II (16-20)

Variables	Phase I (N=25) $\bar{X}$	Phase I (N=25) SD	Phase II (N=25) $\bar{X}$	Phase II (N=25) SD	F Ratio	Ceiling Score
1. Lying I	3.00	.00	3.00	.00	.00	3
2. Lying II	2.52	.87	3.00	.00	7.58**	3
3. Lying III	2.84	.55	3.00	.00	2.09	3
4. Justice I	2.28	.98	2.04	1.02	.68	3
5. Justice II	1.64	.95	2.84	.55	27.00**	3
6. Clumsiness and Stealing I	2.68	.75	3.00	.00	4.57*	3
7. Clumsiness and Stealing II	2.84	.55	2.92	.40	.32	3
8. Clumsiness and Stealing III	2.84	.55	3.00	.00	2.09	3
9. Collective Responsibility I	3.72	.68	3.92	.40	3.00	4
10. Collective Responsibility II	3.20	1.00	3.52	.87	1.35	4
11. Collective Responsibility III	3.76	.52	3.92	.40	2.09	4

* $p < .05$

** $p < .01$

TABLE 6

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES FOR RETARDATES - PHASE I (6-10) AND PHASE II (8-12)

Variables	Phase I (N=25)		Phase II (N=25)			
	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio	Ceiling Score
1. Lying I	1.56	.77	2.00	.87	3.85	3
2. Lying II	1.72	.61	1.72	.94	.00	3
3. Lying III	1.48	.71	1.68	.75	1.33	3
4. Justice I	1.72	.74	1.28	.54	4.13*	3
5. Justice II	1.44	.71	1.92	.91	5.27*	3
6. Clumsiness and Stealing I	1.40	.58	1.56	.82	.66	3
7. Clumsiness and Stealing II	2.24	.52	1.16	.37	59.11**	3
8. Clumsiness and Stealing III	1.72	.89	1.36	.70	2.61	3
9. Collective Responsibility I	2.84	1.28	3.64	1.00	10.67**	4
10. Collective Responsibility II	1.24	.60	3.04	1.10	48.60**	4
11. Collective Responsibility III	2.32	.99	2.88	1.17	2.93	4

* $p < .05$

** $p < .01$

TABLE 7

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES
FOR RETARDATES - PHASE I (10-14) AND PHASE II (12-16)

Variables	Phase I (N=25)		Phase II (N=25)			
	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio	Ceiling Score
1. Lying I	2.52	.77	2.56	.77	.09	3
2. Lying II	2.40	.87	2.16	.99	1.30	3
3. Lying III	1.92	1.00	2.36	.91	2.32	3
4. Justice I	2.32	.80	2.08	.95	1.21	3
5. Justice II	1.56	.87	2.32	.90	9.48**	3
6. Clumsiness and Stealing I	1.80	.96	1.96	1.02	.29	3
7. Clumsiness and Stealing II	2.40	.87	1.40	.76	17.65**	3
8. Clumsiness and Stealing III	2.00	1.00	1.80	1.00	.46	3
9. Collective Responsibility I	3.16	1.28	3.80	.58	4.41*	4
10. Collective Responsibility II	1.56	1.16	3.00	1.04	29.51**	4
11. Collective Responsibility III	2.88	1.20	3.48	.87	4.70*	4

* $p < .05$

** $p < .01$

TABLE 8

ANALYSES OF VARIANCE OF MORAL JUDGMENT POINT SCALE SCORES
FOR RETARDATES - PHASE I (14-18) AND PHASE II (16-20)

Variables	Phase I (N=25)		Phase II (N=25)		F Ratio	Ceiling Score
	$\bar{X}$	SD	$\bar{X}$	SD		
1. Lying I	2.56	.82	2.52	.65	.06	3
2. Lying II	1.88	.97	2.52	.87	7.74**	3
3. Lying III	2.48	.87	2.44	.71	.03	3
4. Justice I	2.48	.87	1.88	.93	5.14*	3
5. Justice II	2.44	.82	2.56	.65	.28	3
6. Clumsiness and Stealing I	1.80	1.00	2.32	.90	8.02**	3
7. Clumsiness and Stealing II	2.60	.76	1.36	.70	40.89**	3
8. Clumsiness and Stealing III	2.16	.99	2.08	1.00	.18	3
9. Collective Responsibility I	3.84	.63	4.00	.00	1.64	4
10. Collective Responsibility II	1.96	1.43	3.16	1.14	14.90**	4
11. Collective Responsibility III	2.80	1.35	3.24	.88	2.23	4

* $p < .05$

** $p < .01$

TABLE 9

ANALYSES OF VARIANCE FOR MORAL JUDGMENT POINT SCALE SCORES FOR RETARDATES
6-10 (Phase I) vs. 12-16 (Phase II) and 10-14 (Phase I) vs. 16-20 (Phase II)

	Ceiling Score	Phase I 6-10		Phase II 12-16		F Ratio	Phase I 10-14		Phase II 16-20		F Ratio
		$\overline{X}$ (N=25)	SD	$\overline{X}$ (N=25)	SD		$\overline{X}$ (N=25)	SD	$\overline{X}$ (N=25)	SD	
1. Lying I	3	1.56	.77	2.56	.77	18.75**	2.52	.77	2.52	.65	0.00
2. Lying II	3	1.72	.61	2.16	.99	3.40	2.40	.87	2.52	.87	0.19
3. Lying III	3	1.48	.71	2.36	.91	14.24**	1.92	1.00	2.44	.71	3.67
4. Justice I	3	1.72	.74	2.08	.95	2.45	2.32	.80	1.88	.93	3.21
5. Justice II	3	1.44	.71	2.32	.90	18.86**	1.56	.87	2.56	.65	30.00**
6. Clumsiness & Stealing I	3	1.40	.58	1.96	1.02	6.68*	1.80	.96	2.32	.90	8.02**
7. Clumsiness & Stealing II	3	2.24	.52	1.40	.76	19.82**	2.40	.87	1.36	.70	19.69**
8. Clumsiness & Stealing III	3	1.72	.89	1.80	1.00	0.11	2.00	1.00	2.08	1.00	0.09
9. Collective Responsibility I	4	2.84	1.28	3.80	.58	13.50**	3.16	1.28	4.00	0.00	10.76**
10. Collective Responsibility II	4	1.24	.60	3.00	1.04	53.78**	1.56	1.16	3.16	1.14	26.48**
11. Collective Responsibility III	4	2.32	.99	3.48	.87	20.51**	2.88	1.20	3.24	.88	1.22
12. Rules of the Game - Has Rules	3	2.04	.35	2.84	.37	64.00**	2.44	.58	2.60	.65	0.72
13. Rules of the Game - Changes Rules	3	1.56	.51	2.36	.70	21.33**	1.80	.50	2.24	.83	4.81*

* $p < .05$; ** $p < .01$

TABLE 10

ANALYSES OF VARIANCE FOR MORAL JUDGMENT RULES OF THE GAME SCORES FOR PHASE I AND PHASE II ACCORDING TO AGE GROUPS

	N	Phase I		Phase II		F Ratio
		$\bar{X}$	SD	$\bar{X}$	SD	
VERBALIZES RULES (Ceiling Score = 1)						
Younger Normals	25	1.00	.00	1.00	.00	0.00
Middle Normals	25	1.00	.00	1.00	.00	0.00
Older Normals	25	1.00	.00	1.00	.00	0.00
Younger Retardates	25	.96	.20	.96	.20	0.00
Middle Retardates	25	1.00	.00	1.00	.00	0.00
Older Retardates	25	.96	.20	.96	.20	0.00
FOLLOWS RULES (Ceiling Score = 1)						
Younger Normals	25	.68	.48	.88	.33	4.00
Middle Normals	25	.92	.28	1.00	.00	2.09
Older Normals	25	.92	.28	1.00	.00	2.09
Younger Retardates	25	.12	.33	.56	.51	14.24**
Middle Retardates	25	.60	.50	.84	.37	3.27
Older Retardates	25	.60	.50	.72	.46	1.30
CAN CHANGE RULES (Ceiling Score = 3)						
Younger Normals	24	1.83	.48	2.25	.79	4.83*
Middle Normals	24	2.04	.81	2.79	.41	16.41**
Older Normals	23	2.26	.69	2.91	.42	15.09**
Younger Retardates	25	1.56	.51	1.96	.68	5.61*
Middle Retardates	24	1.79	.51	2.42	.65	13.65**
Older Retardates	25	1.68	.48	2.24	.83	8.55**

* $p < .05$; ** $p < .01$

A COMPARISON OF THE DEVELOPMENT OF MORAL CONDUCT IN NORMALS AND RETARDATES

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Studies by Hartshorne & May (1928, 1929), conducted almost a half-century ago, have remained the major contributions in the field of moral conduct. The technique which they used, placement of subjects in temptation situations in order to observe their tendency for impulsivity versus their powers of self-restraint and inner discipline, provided scientific information on honesty, cooperation, and persistence. The absence of strong interrelationships between scores on various measures of conduct resulted in conclusions which emphasized the specificity of behavior: i.e., suppression of prohibited behavior in one type situation was not found to generalize to other types of situations. Such minimal evidence of integration of character was questioned by Maller (1934). When he subjected the Hartshorne and May data to factor analytic techniques a common factor which was suggestive of delay of gratification emerged. Later, when the same data were reanalyzed by Burton (1963) still more consistency in behavior was revealed (Aronfreed, 1968). Thus the issue generated by the early studies was one of specificity versus generality to the exclusion of repeated measurement over time of moral conduct which would provide data on moral development. This neglect prompted May's recent statement (1970), "True pictures of moral development can only be obtained by longitudinal studies in which the same group of children is tested year after year." In concurrence with May's statement an on-going longitudinal study at Temple University provides biennial observation and comparison of the development of moral conduct in normals and retardates. Techniques similar to those devised by Hartshorne and May were employed. Comparisons and implications noted in the moral conduct of normals and retardates over a two-year period were the basis of this present discussion.

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MORAL CONDUCT VARIABLES

Structured situations were devised in order to observe the subjects' behavioral responses. These include:

Self-control: Did the subject take cigarettes or candy from a dish during a time when the examiner was out of the room?

Honesty: When the subject found an attractive ball point pen did he attempt to find the owner or did he pocket it?

Money Return: The examiner unobtrusively put an extra dime with those used in an experiment. Did the subject claim the extra dime as his own?

Mishap: During the time the subject was alone and engaged in an experimental task an attractive young lady entered the room (against orders) for some papers; in getting them she overturned a vase and water spilled over other papers on the desk. As she left she begged the subject not to tell anyone she had been there. When the examiner returned did the subject provide information on the mishap?

Cheating: Blank cards, a rubber stamp, and an ink pad were provided the subject as the examiner explained there was interest in seeing who could stamp the most cards in five minutes. Each card was to be stamped in all four corners of both sides; in addition, the rubber stamp was to be applied to the ink pad prior to each stamping. As the examiner left the room he instructed the subject to observe the clock and start when the minute hand reached a specified point. Scores were obtained on:

(1) Observance of starting time

(2) Correct counting of stamped cards

(3) Observed persistence

(4) Accuracy in stamping the four corners

(5) Inking the rubber stamp prior to each application.

Persistence: Instructions were to warch a three-minute sand glass, and when the sand had drained out to flip it quickly. During the time the examiner was out of the room the subject was expected to make five turns (15 minutes). Scores were obtained on:

(1) Truthfulness in reporting number of flips

(2) Observed persistence

(3) Acknowledgement of delayed flipping

PHASE I - INITIAL TWO YEARS OF STUDY

Findings from Phase I in the area of moral conduct are of extreme interest because of the indication that this aspect of behavior is developmental in nature. Viewing normals and retardates separately, each group showed a significant decrease in misconduct scores as they increased in age. At each level misconduct scores for retardates were approximately twice as great as those for normals. Yet when retardates were compared with normals of similar mental age, there was no significant difference. The results strongly suggest that moral conduct does follow a developmental sequence.

PHASE II - THIRD AND FOURTH YEARS OF STUDY

Efforts to assess the sequential development of moral conduct are found in this section. Of major concern is the comparison of Phase I and II data, a comparison which provides evidence on moral development over a two-year span.

Table I sets forth the results of frequency analyses performed on failure scores for normals and retardates in Phases I and II. It can be noted that the number of failures decreased for both groups over the two-year period. Also, inter-age group analyses for normals indicate total number of failures decreased for the three groups. Similar results are observed in the retarded younger and older age groups. However, the number of failures increased over the two-year period for the middle age group of retardates.

When differences on moral conduct scores among the various age groups of normals and retardates for Phase I were compared with differences for Phase II (Table 2) interesting results emerged. Phase I data contain differences, significant at the .01 level, between the performance of the middle and younger age groups of retardates; yet, with two years advance in age, the middle age groups of retardates ceased to be significantly superior. This arrestation or oscillation in development, which occurs in retardates around the twelfth through sixteenth years, was also indicated in the previously discussed frequency count of misdeeds. By contrast, Phase I data for the older group of retardates did not differ significantly from that for the middle group on moral conduct, but two years later, during Phase II, the older group did display performance which was superior at the .05 level. A decrease in the mean violations for the 16 to 20 group negates the possibility of attributing this difference solely to an increase of mean violations (from 3.76 to 4.04) for the middle age group. What the findings suggest is that retardates, as they approach middle adolescence, tend to display little or no increase in conduct scores, and in some instances display an actual decrease, but as they move into late adolescence development again continues.

Comparable oscillations did not occur when data for the middle and younger age groups of normals were compared for Phase I and Phase II (Table 2). Differences which favored the middle group continued to be significant at the .01 level; likewise, differences between the older and middle age groups of normals continued to be significant at the .05 level. Drop from the .01 to the .05 level of significance suggests that the tempo of development lessens as normals approach late adolescence.

In an effort to pin-point increases and/or decreases in conduct violations, scores on specific tasks for Phase I were compared with those for Phase II for older retardates through analysis of variance techniques (Table 3). Significant differences occurred on only one variable; retardates 16 to 20 reported less frequently on the misdeeds of a peer than they had two years previously (14 to 18). When a corresponding analysis was made of Phase I and Phase II data for both normals and retardates of the middle age range (Tables 3 and 4), normals, ages 12 to 16, showed increased honesty in seeking the owner of an article which they found and in correctly reporting the amount of work which they had accomplished; but they also had significant increases in failure to report the misdeeds of a peer. Retardates, ages 12 to 16, exercised less control in temptation situations than they previously had, but demonstrated more honesty in the handling of coins.

When younger normals were reassessed after a two-year interval (present age range 8 to 12) their conduct, as set forth in Table 4, indicates increased honesty in the disposition of articles and coins which were unclaimed. Retardates of the same age range showed significantly improved conduct in these same areas; they also increased in their ability to follow directions in the absence of a supervisor. Normals, but not retardates, in the 8 to 12 age range, informed significantly less on peers than they had two years previously. It was in the 16 to 20 age group of retardates that loyalty to persons of peer age versus truthfulness in the report of a misdeed resulted in a significant change in conduct scores.

As in Phase I, the effect of mental age on moral conduct was assessed through analysis of covariance techniques (Table 6). In Phase I, differences between the performance of normals and retardates remained significant on four variables when mental age was held constant. During Phase II these differences reduced to three significant variables. Retardates continued to exhibit less persistence in work situations; they were more frequent in their neglect to find an owner for articles which they found, and were less willing to report the misdeeds of a peer-aged person.

When both mental age and chronological age were covaried in Phase I, normals remained significantly superior on four variables; in Phase II there were no significant differences. Thus, change in the behavior of retardates over a two-year period resulted in conduct approximately equivalent to that of normals when mental and chronological age were held constant.

DISCUSSION AND CONCLUSIONS

Present findings serve to destroy the myth that retardates are more prone to engage in misconduct than normals. There is equivalence in the conduct of normals and retardates of comparable mental age. Actually, what becomes apparent is that moral conduct is developmental and that the incidence of acts of misconduct diminishes with increased mental and chronological age. Although retardates 16 to 20 cannot be expected to exhibit the maturity of conduct observed in normals of comparable chronological age, perhaps they can be trained to assume the self-control exhibited by normal persons of equivalent mental age. Through longitudinal study, provision of the sequence of development observed in moral conduct will make it possible to locate an individual's present level of functioning. Then, immediate remedial efforts will center on promoting development to the next level, not on immediately trying to instill total self-control or responsibility.

Because the period showing the greatest increase in measured moral conduct for retardates is between the years 6 to 10 or 8 to 12, it seems apparent that training efforts should be initiated before and emphasized during these early years in an effort to prevent possible later decrement. The arrestation or oscillation in development found to occur in retardates between ages 12 through 16 indicates that improvement efforts should be continued through these years.

Perhaps training efforts should be intensified during the 6 to 10 age range in an effort to offset later decrement in performance. Adolescent retardates may not be developmentally ready to assume total responsibility for their conduct, and there is suggestion that supervision of retardates during this "critical" period should be maintained.

The finding that moral conduct is developmental and that it continues in retardates through late adolescence serves to substantiate findings which issue from a recent transitional program for institutionalized adult retardates (Clark, Kivitz, and Rosen, 1968) which demonstrated that adolescent retardates tended to have a stormy initial community life, whereas older retardates adapted more successfully to this period of transition.

With these findings various practical applications cen be suggested. Training techniques could derive from the methods used in the longitudinal study to assess moral conduct, techniques adapted from the early work of Hartshorne and May (1929) and from later work by Murray (1947). After discussion of the consequences of alternate forms of behavior the subject could be placed in contrived situations which will either provide temptation to engage in misconduct (cheat, steal, ignore rules, deceive, etc.) or provide opportunity to engage in autonomous or altruistic behavior (participation in self-governing bodies, assistance to others, etc.).

Examples of contrived situations are: opportunity to steal in a workshop situation which involves the packaging of articles for a grooming kit; observance of time schedules in the absence of a supervisor would provide opportunity for autonomous behavior as would the opportunity to engage in decision-making while serving as a member of a self-governing group.

For persons who exhibit deficits in moral conduct, the initial contrived situations would contain only slight opportunity for misconduct or for a limited degree of autonomy, and social reward would follow desirable behavior. As development in moral conduct proceeds, contrived situations would entail greater degrees of conflict. In discussion periods, consideration will be given the short and long term results of alternate forms of behavior.

Data obtained on subjects who engaged in legal misconduct acts during the interval between Waves One and Two testing indicate these measures may have value as screening instruments. However, a more extensive follow-up must be accomplished in order to establish their predictive validity.

What the findings suggest is that moral conduct is developmental in nature in both normals and retardates. As retardates approach middle adolescence they tend to display little or no increase in conduct ability, but as they progress into late adolescence development again continues.

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TABLE 1

TOTAL FAILURES FOR NORMALS AND RETARDATES ON THIRTEEN MEASURES OF MORAL CONDUCT

PHASE I			PHASE II		
Age Groups	Normals	Retardates	Age Groups	Normals	Retardates
14-18	27	72	16-20	21	60
10-14	48	85	12-16	41	92
6-10	84	157	8-12	79	118
Total	159	314	Total	141	270

TABLE 2

ANALYSES OF VARIANCE OF TOTAL SCORES

FOR MORAL CONDUCT VIOLATIONS FOR NORMALS AND RETARDATES

	PHASE I			PHASE II		
Group	SD	$\overline{X}$	F Ratio	SD	$\overline{X}$	F Ratio
Older Normals vs Younger Normals	1.26 2.03	1.20 3.76	28.79**	0.95 2.23	0.92 3.36	25.23**
Middle Normals vs Younger Normals	1.75 2.03	2.28 3.76	7.66**	1.39 2.23	1.76 3.35	9.24**
Older Normals vs Middle Normals	1.26 1.74	1.20 2.28	6.30*	0.95 1.39	0.92 1.76	6.19*
Older Retardates vs Younger Retardates	2.21 2.98	3.15 6.60	21.56**	2.08 2.21	2.40 4.72	14.61**
Middle Retardates vs Younger Retardates	2.39 2.98	3.76 6.60	13.88**	2.95 2.21	4.04 4.72	0.85
Older Retardates vs Middle Retardates	2.21 2.39	3.16 3.76	0.85	2.08 2.95	2.40 4.04	5.16*
Younger Normals vs Younger Retardates	2.03 2.97	3.76 6.60	15.58**	2.23 2.20	3.36 4.72	4.69*
Middle Normals vs Middle Retardates	1.74 2.39	2.28 3.76	6.27*	1.39 2.95	1.76 4.04	12.21**
Older Normals vs Older Retardates	1.26 2.21	1.20 3.16	14.84**	0.95 2.08	0.92 2.40	10.44**
Younger Normals vs Middle Retardates	2.03 2.39	3.76 3.76	0.00	2.23 2.95	3.36 4.04	0.84
Middle Normals vs Older Retardates	1.75 2.21	2.28 3.16	2.44	1.39 2.08	1.76 2.40	1.63

* p .05
** p .01
N = 25 in each group

OLDER = 14-18 Phase I
16-20 Phase II

MIDDLE = 10-14 Phase I
12-16 Phase II

YOUNGER = 6-10 Phase I
8-12 Phase II

TABLE 3

ANALYSES OF VARIANCE OF MORAL CONDUCT SCORES ACROSS PHASE BY AGE RANGE - RETARDATES

VARIABLES	6-10		8-12			10-14		12-16			14-18		16-20		
	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio	$\bar{X}$	SD	$\bar{X}$	SD	F Ratio
1. Self control	.76	.44	.80	.41	0.19	.84	.37	.60	.50	4.04*	.88	.33	.76	.44	1.86
2. Honesty	.64	.49	1.00	.00	13.50**	.68	.48	.80	.41	1.30	.84	.37	.96	.20	3.27
3. Money Return	.52	.51	.80	.41	6.68*	.60	.50	.88	.33	9.33**	.80	.41	.92	.28	3.27
4. Mishap (1)	.60	.50	.44	.51	1.64	.84	.37	.64	.49	4.00	.88	.33	.56	.51	8.26**
5. Mishap (2)	.84	.37	.92	.28	1.00	.92	.28	.92	.28	0.00	.92	.28	.96	.20	1.00
6. Cheating (1)	.60	.50	.68	.48	0.28	.76	.44	.84	.37	0.39	.68	.48	.84	.37	2.09
7. Cheating (2)	.60	.50	.64	.49	0.11	.80	.41	.68	.48	0.81	.64	.49	.84	.37	2.40
8. Cheating (3)	.44	.51	.48	.51	0.14	.72	.46	.64	.49	0.49	.80	.41	.80	.41	0.00
9. Cheating (4)	.48	.51	.60	.50	0.81	.88	.33	.72	.46	2.87	.80	.41	.88	.33	0.49
10. Cheating (5)	.16	.37	.40	.50	5.27*	.44	.51	.40	.50	0.11	.52	.51	.56	.51	0.09
11. Persistence (1)	.36	.49	.44	.51	0.39	.72	.46	.60	.50	1.30	.76	.44	.84	.37	0.66
12. Persistence (2)	.40	.50	.60	.50	3.00	.68	.48	.64	.49	0.11	.84	.37	.84	.37	0.00
13. Persistence (3)	.32	.48	.48	.51	1.64	.68	.48	.60	.50	0.49	.68	.48	.84	.37	2.09

* $p < .05$; ** $p < .01$

TABLE 4

ANALYSES OF VARIANCE OF MORAL CONDUCT SCORES
ACROSS PHASE BY AGE RANGE - NORMALS

VARIABLES	6-10		8-12		F Ratio	10-14		12-16		F Ratio	14-18		16-20		F Ratio
	$\bar{X}$	SD	$\bar{X}$	SD		$\bar{X}$	SD	$\bar{X}$	SD		$\bar{X}$	SD	$\bar{X}$	SD	
1. Self Control	.84	.37	.64	.49	3.00	.88	.33	.84	.37	0.19	.96	.20	.92	.28	1.00
2. Honesty	.60	.50	1.00	.00	16.00**	.80	.41	1.00	.00	6.00*	.88	.33	1.00	.00	3.27
3. Money Return	.56	.51	.96	.20	16.00**	.96	.20	1.00	.00	1.00	.92	.28	1.00	.00	2.09
4. Mishap (1)	.72	.46	.24	.44	13.50**	.92	.28	.52	.51	12.00**	.88	.33	.68	.48	4.00
5. Mishap (2)	1.00	.00	1.00	.00	0.00	.92	.28	.84	.37	0.66	.96	.20	.84	.37	3.27
6. Cheating (1)	.76	.44	.88	.33	1.86	.92	.28	1.00	.00	2.09	.96	.20	1.00	.00	1.00
7. Cheating (2)	.96	.20	.76	.44	4.00	.84	.37	1.00	.00	4.57*	.88	.33	1.00	.00	3.27
8. Cheating (3)	.88	.33	.96	.20	1.00	.96	.20	1.00	.00	1.00	1.00	.00	1.00	.00	0.00
9. Cheating (4)	.64	.49	.64	.49	0.00	.68	.48	.76	.44	0.39	.92	.28	.88	.33	0.19
10. Cheating (5)	.32	.48	.48	.51	1.15	.44	.51	.72	.46	3.61	.80	.41	.88	.33	0.49
11. Persistence (1)	.84	.37	.72	.46	1.00	.96	.20	.84	.37	1.86	.96	.20	.96	.20	0.00
12. Persistence (2)	.76	.44	.68	.48	0.39	.92	.28	.88	.33	0.19	.92	.28	.96	.20	0.32
13. Persistence (3)	.76	.44	.68	.48	0.49	.88	.33	.84	.37	0.14	.88	.33	.96	.20	1.00

* $p < .05$; ** $p < .01$

TABLE 5

ANALYSES OF VARIANCE FOR MORAL CONDUCT SCORES FOR RETARDATES
6-10 (Phase I) vs. 12-16 (Phase II) and 10-14 (Phase I) vs. 16-20 (Phase II)

VARIABLES	Phase I 6-10		Phase II 12-16		F Ratio	Phase I 10-14		Phase II 16-20		F Ratio
	$\bar{X}$	SD	$\bar{X}$	SD		$\bar{X}$	SD	$\bar{X}$	SD	
1. Self Control	.76	.44	.60	.50	1.64	.84	.37	.76	.44	0.49
2. Honesty	.64	.49	.80	.41	1.35	.68	.48	.96	.20	6.68*
3. Money Return	.52	.51	.88	.33	10.02**	.60	.50	.92	.28	6.51*
4. Mishap (1)	.60	.50	.64	.49	0.06	.84	.37	.56	.51	4.26*
5. Mishap (2)	.84	.37	.92	.28	0.66	.92	.28	.96	.20	0.32
6. Cheating (1)	.60	.50	.84	.37	3.27	.76	.44	.84	.37	0.39
7. Cheating (2)	.60	.50	.68	.48	0.32	.80	.41	.84	.37	0.19
8. Cheating (3)	.44	.51	.64	.49	1.50	.72	.46	.80	.41	0.32
9. Cheating (4)	.48	.51	.72	.46	2.37	.88	.33	.88	.33	0.00
10. Cheating (5)	.16	.37	.40	.50	2.75	.44	.51	.56	.51	0.59
11. Persistence (1)	.36	.49	.60	.50	4.04*	.72	.46	.84	.37	1.00
12. Persistence (2)	.40	.50	.64	.49	3.27	.68	.48	.84	.37	1.64
13. Persistence (3)	.32	.48	.60	.50	5.20*	.68	.48	.84	.37	1.64

* $p < .05$; ** $p < .01$

TABLE 6

ANALYSES OF COVARIANCE FOR MORAL CONDUCT SCORES WITH MENTAL AGE AND MENTAL and CHRONOLOGICAL AGE HELD CONSTANT FOR NORMALS AND RETARDATES

Variables	Mental Age+					Mental & Chronological Age++				
	Unadjusted $\overline{X}$		Adjusted $\overline{X}$			Unadjusted $\overline{X}$		Adjusted $\overline{X}$		
	N	R	N	R	F	N	R	N	R	F
1. Self Control	.80	.72	.74	.78	0.14	.80	.72	.73	.79	0.20
2. Honesty	1.00	.92	1.00	.92	4.01*	1.00	.92	.99	.93	0.95
3. Money Return	.99	.87	.96	.89	1.59	.99	.87	.97	.88	1.38
4. Mishap (1)	.48	.55	.40	.63	5.15*	.48	.55	.45	.57	0.54
5. Mishap (2)	.89	.93	.92	.91	0.03	.89	.93	.91	.92	0.02
6. Cheating (1)	.96	.79	.91	.84	1.36	.96	.79	.88	.87	0.03
7. Cheating (2)	.92	.72	.87	.77	1.70	.92	.72	.90	.74	1.95
8. Cheating (3)	.99	.64	.92	.70	10.40**	.99	.64	.84	.79	0.19
9. Cheating (4)	.76	.73	.69	.81	2.04	.76	.73	.75	.74	0.01
10. Cheating (5)	.69	.45	.61	.54	0.49	.69	.45	.62	.54	0.22
11. Persistence (1)	.84	.63	.74	.73	0.02	.84	.63	.79	.68	0.71
12. Persistence (2)	.84	.69	.75	.78	0.20	.84	.69	.76	.77	0.01
13. Persistence (3)	.83	.64	.72	.74	0.04	.83	.64	.77	.69	0.34

+ df = 1 and 147   * $p < .05$ ** $p < .01$

++ df = 1 and 146

LONG TERM MEMORY IN NORMALS AND RETARDATES

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The present research has centered on the development of operatory thought and its relation to the memory process in normals and retardates. Interest is in the basic capacities and dispositions which the learner brings to the experimental situation and which determine the initial reception and storage of information subsequently to be recalled or retrieved. To this end the theories and techniques of Jean Piaget and his Genevan students and co-workers served as the context of this study. The investigator sought to determine (1) if relationships existed among Piagetian measures of reasoning and memory, and (2) if development of the memory process in normals and retardates is identical.

Two positions may be taken when the memory processes are investigated. Some researchers have hypothesized that memory is passive in nature. That is, memory is a recording organ through which information is recorded into a storage area. Perhaps the simplest example of this position was advanced by the British empiricist John Locke, who suggested that the mind is merely a blank tablet. The second position asserts that memory is an active process; the subject is like an historian who reconstructs the past when he is asked to relate past events.

The second hypothesis that memory is an active process has been selected for study in the present investigation. Specifically, the theory advanced by Piaget (1968), and Inhelder and Sinclair (1968) will be employed.

According to Piaget memory is a system in which encoding, decoding and an intervening associative structure (code) are integral parts. It is the intervening structure or code that is of central interest to Piaget. Memory is considered to be a progressive organizing and reorganizing of reality by means of organizational structures (operations) which become extended and restructured as thought becomes more complex. The coding process is modified by this development and consequently is dependent upon it at any given time. That is, recall ability (behaviorally defined by accuracy or detail) depends on the level of cognitive development attained by the subject. Generally, if recall improves over a period of time Piagetian theory would suggest that the subject's coding process has improved because of progress in his operational development. Conversely, if there is no improvement in the quality of recall, then generally, there has not been the appropriate operational development.

From the above statements it can be seen that memory has two components - the figurative and the operative. Figurative aspects of memory are refered to by Inhelder (1969) as perception, imitation, and image formation. The operative memory component consists of actions or operations (thought processes). Perhaps the distinction between the figurative and the operative is better understood when one differentiates between a "scheme" and a "schema". Inhelder (1969) has defined a schema as being "merely a simplified imagined representation of a specific action" (p. 340). By contrast, a scheme is representative of a general operatory development - development which permits action on a variety of objects.

The Genevans propose that the figurative aspects of memory cannot explain memory by themselves; they are dependent on the individual's level of operations. Forgetting, behaviorally defined as recall that is less representative of the initially viewed configuration, occurs when two conflicting schemes exist side by side. This conflict confounds the figurative component of memory and the reproduction quality suffers (Inhelder, 1969). The hypothesis may be interpreted to mean that if a subject is presented with an array of seriated sticks to memorize, and the scheme that would permit him to arrange objects in a series had not been achieved, then his recall of the array would suffer.

Although there are many studies in the literature delving into the processes of memory and the effects it may have on learning there are few which follow Piaget's paradigm. Research carried out by Inhelder and Piaget most clearly represent the Genevan hypotheses. In one study (Piaget, 1968) children aged three to seven were shown an ordered array of sticks which varied in size from nine to fifteen centimeters. One week after presentation each subject was asked to draw what he had seen the previous week. Finally, six months later, a second drawing was requested.

Three interesting findings evolved from the Genevan study. First, representations after one week suggested that retention did not necessarily reflect the perceived stimulus. Instead it was a replica of what had been assimilated in the subject's schematic organization. For example, three to five year old subjects had reached an operational level which allowed them to reproduce sticks of equal length. At more advanced levels in which understanding of seriation occurred the subjects were able to represent the stimulus as an ordered array.

A second finding was that all subjects "claimed" they remembered the stimulus object. However, when given the opportunity to demonstrate the memory by a drawing, it was noted that there were marked discrepancies between what subjects thought they remembered and what they demonstrated. That is, rather than remembering the complete configuration, a majority of subjects retained only a part of the configuration.

Finally, seventy-four percent of the subjects in the study were found to have increased recall, i.e., their drawing of the initial configuration indicated better recollection at six months than at one week. These results led Piaget and Inhelder to conclude that memory is a coding process, but it is the operational structures that have become modified, a shceme or system more adequately structured than before. The drawings at six months were indicative of the current operative level, not of the level at which the subject previously operated during the initial presentation (Inhelder and Sinclair, 1968).

Studies reviewed tend to be supportive of Piaget's assertion that the child's representation of his world is dependent on the level of cognitive development at which the child is currently functioning. Thus, investigators who have attempted to replicate, constructive or otherwise, Piaget's initial studies into the memory processes of children have provided evidence which supports Piaget's claim that there is a positive correlation between the level of cognitive development a child has reached and his ability to recall a stimulus configuration. (Dahlen, 1969; Murray & Bausel, 1971; Dahlen, 1968; Stephens, Garrison, Anderson, & Cogan, 1970; Altemeyer, et. al., 1968.)

SUBJECTS:

Forty-eight normal subjects (IQ 90-110; CA 8-20) and forty-eight retarded subjects (IQ 50-75; CA 8-20) were randomly selected from public schools in the Philadelphia area. The groups, normal and retarded, were further sub-divided into the following age ranges: 8-12, 12-16, and 16-20.

PROCEDURE:

Following Inhelder's approach to the study of reasoning, memory and mental imagery, a battery of assessments, including conservation, spatial imagery, and memory tasks, was presented to subjects on three recall occasions. On the first occasion an arrangement of ovals, rectangles, and diamonds was shown to each subject. Immediately following presentation the subject was asked to draw the configuration from memory. One week later, recall was assessed by requiring that the subjects first draw and then reconstruct the original configuration from a random assortment of geometrical figures. Six months after the second presentation and again without viewing the configuration the subject was asked to first draw and then reconstruct the arrangement.

The reconstruction phase of the procedure was included so that some differentiation between evocative and reconstructive memory might be made. Evocative memory is defined as requiring some form of operational development, i.e., representational thought is necessary for reproduction. On the other hand reconstructive memory lies somewhere between recognitive and evocative memory. Through recognitory memory the subject will recognize the parts of the stimulus object when they are presented in a random assortment. Since elements must be arranged into the previously viewed configuration, thus requiring classificatory skills, evocative memory also enters into the task.

RESULTS:

Repeated measures analyses of variance were employed to determine if quality of recall increased as a function of time in normals and retardates (See tables 1 and 2). Results indicate that normals performed significantly better than retardates on all recall occasions (immediate, one week, and six months). However, an increase in recall scores over the six month period was not observed in either group (normals and retardates); significantly lower scores were obtained as a function of time. Differences were significant in the retarded and normal subjects' performance at one week and six months. That is, scores at six months were significantly lower than scores at one week in both groups (see figures 1 and 2). Significant main effects for age which indicated that older children performed superior to younger children were noted only in the data derived from the memory drawing assessment.

Trend analyses revealed that in both normals and retardates a descending linear function best described the data. Tests of differences between the slopes of this function in both groups were not significant, i.e., normals and retardates in the present sample tended to show a diminution of performance at the same rate. (See figures 1 and 2.)

In an effort to establish the relationships between Piagetian measures of reasoning and memory three multiple regression analyses were accomplished (total group, normals, and retardates). Results of the analyses indicate that both Piagetian measures of reasoning and standard measures of intelligence (WISC or WAIS) added to the prediction of memory (reconstructive and evocative). It is important to note that in all three analyses Piagetian reasoning measures were the most efficient predictors.

CONCLUSIONS:

In retrospect, Piaget and his associates have suggested that memory is associated with the level of cognitive development. After an image is formed, recall of that image depends on the individual's level of cognitive development. With progression of time recall of the stimulus object will become clearer if there is a corresponding cognitive development. In the present study, results indicate that normals, who have reached a higher level of cognitive development than the retardates, perform significantly better. However, neither group displayed growth over time in recall phases. Either significant cognitive development did not occur in the two groups or this development is not basic to the improvement of memory for the stimuli utilized in the present investigation. An alternative explanation of the forgetting might be that understanding of the relationships set forth in the configuration employed in the present study demanded a level of cognitive development not yet attained by the majority of subjects in this study. Thus, there was no foundation for growth.

In addition, the results suggested that loss of information over time is equivalent in normals and retardates. That is, there seem to be no differences in long-term memory in normals and retardates, a finding which has been substantiated by the majority of research in this area.

Results of multiple regression analyses revealed that a positive relationship exists between memory performance and Piagetian reasoning assessments. The finding suggests that memory is not a distinct area; rather it is one that is related to, if not dependent upon, reasoning ability as measured by the Geneva School.

PEDAGOGICAL IMPLICATIONS:

Additional research, rather than pedagogical implications, should follow from an exploratory investigation such as the present study. However, there are some implications for the teaching of exceptional children which do become evident from research of this type. The initial implication stems from the results of the multiple regression analyses. If memory performance is closely related to operatory development, as the multiple regression data indicates, then educators should be cognizant of their students' current level of cognitive development before engaging them in any learning situation. Thus, a teacher might well expect a child to recall or reconstruct classroom materials that are relevant to his level of cognitive development.

Perhaps the most significant finding obtained in the analysis of the data derived from the performance of normals and retardates over the six month period was that the rate of decrement in scores on both memory assessments (reconstruction and evocative) was the same in normals and retardates. Stated differently, the results suggest that a short term memory deficit which is evidenced in the assessment of immediate recall is the major differentiator between normals and retardates. The differences between normals and retardates remained constant over the six month period. If retardates were able to retain information beyond the initial recall period, then the probability of remembering that information would be equal to the probability of normals retaining the same amount of information. Educational strategies should be directed toward developing more efficient methods which retardates could utilize initially in learning tasks. ¶ An explanation for short term memory deficits has been advanced by Gallager (1960) which may explain the findings derived from the present study. According to Gallager, the findings of his study, which utilized retarded subjects, supported an increasing amount of research which suggested that short term memory is dependent on the number of chunks, or units, into which normals and retardates are able to organize information. ~~Gallager's~~ Gallagher's findings suggest that organization strategies do not become evident until MA 12 is attained. Thus, it seems important for teachers to perform a type of task analysis when they attempt to provide learning experiences for retarded children. That is, it is important to break down the task into as many unique units as possible. The present research indicates that these units should be commensurate with the individual's level of cognitive development, as might be measured by instruments such as those delineated by the previous speakers. Further, strategies such as mnemonics, which facilitate initial organization of information should be utilized.

TABLE ~~2~~ 1

ANALYSIS OF VARIANCE FOR NORMALS AND RETARDATES - DRAWING

Source of variation	SS	df	MS $(\widetilde{N})$	F
Between subjects				
A (Normal/Retardate)	66.34	1	499.55	77.81 *
B (Sex)	.27	1	2.02	
C (Age)	8.75	2	32.94	5.13 *
AB	1.59	1	11.99	
AC	3.35	2	12.62	
BC	2.65	2	9.96	
ABC	1.75	2	6.59	
Error (between)	539.55	84	6.42	
Within subjects				
R (Interval replicates)	36.74	2	138.34	48.80 *
AR	.04	2	.17	
BR	1.21	2	4.54	
CR	1.08	4	2.04	
ABR	.29	2	1.09	
ACR	2.83	4	5.33	
BCR	.45	4	.83	
ABCR	.30	4	.56	
Error (within)	473.86	168	2.88	

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* $p < .01$

TABLE 32

ANALYSIS OF VARIANCE FOR NORMALS AND RETARDATES - RECONSTRUCTION

Source of Variation		SS	df	MS $(\tilde{N})$	F
Between subjects					
A	(Normal/Retardates)	45.38	1	241.67	84.99 *
B	(Sex)	2.11	1	15.91	3.95
C	(Age)	2.74	2	10.30	
AB		1.17	1	3.31	
AC		2.97	2	11.18	
BC		.58	2	2.17	
ABC		1.20	2	4.75	
Error (between)		350.04	87	4.02	
Within subjects					
R	(Interval replicates)	17.61	1	132.63	56.20 *
AR		.83	1	6.24	
BR		.34	1	2.57	
CR		.66	2	2.50	
ABR		.00	1	.01	
ACR		.18	2	.69	
BCR		.30	2	1.12	
ABCR		.04	2	.17	
Error (within)		205.58	87	2.36	

---

* $p < .01$

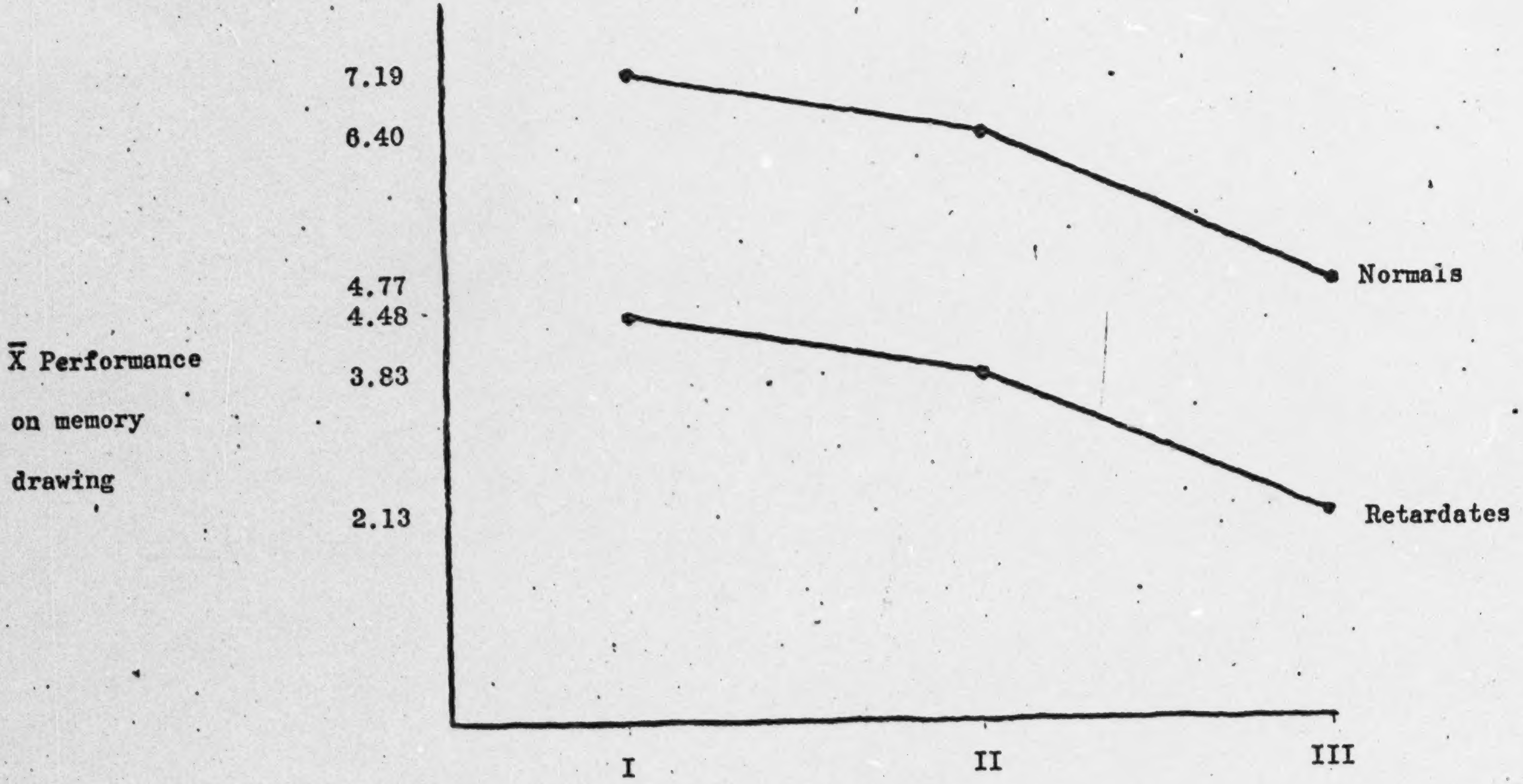


Figure 3

Mean performance for normals and retardates on memory drawing tasks - immediate (I), one week (II), and six months (III).

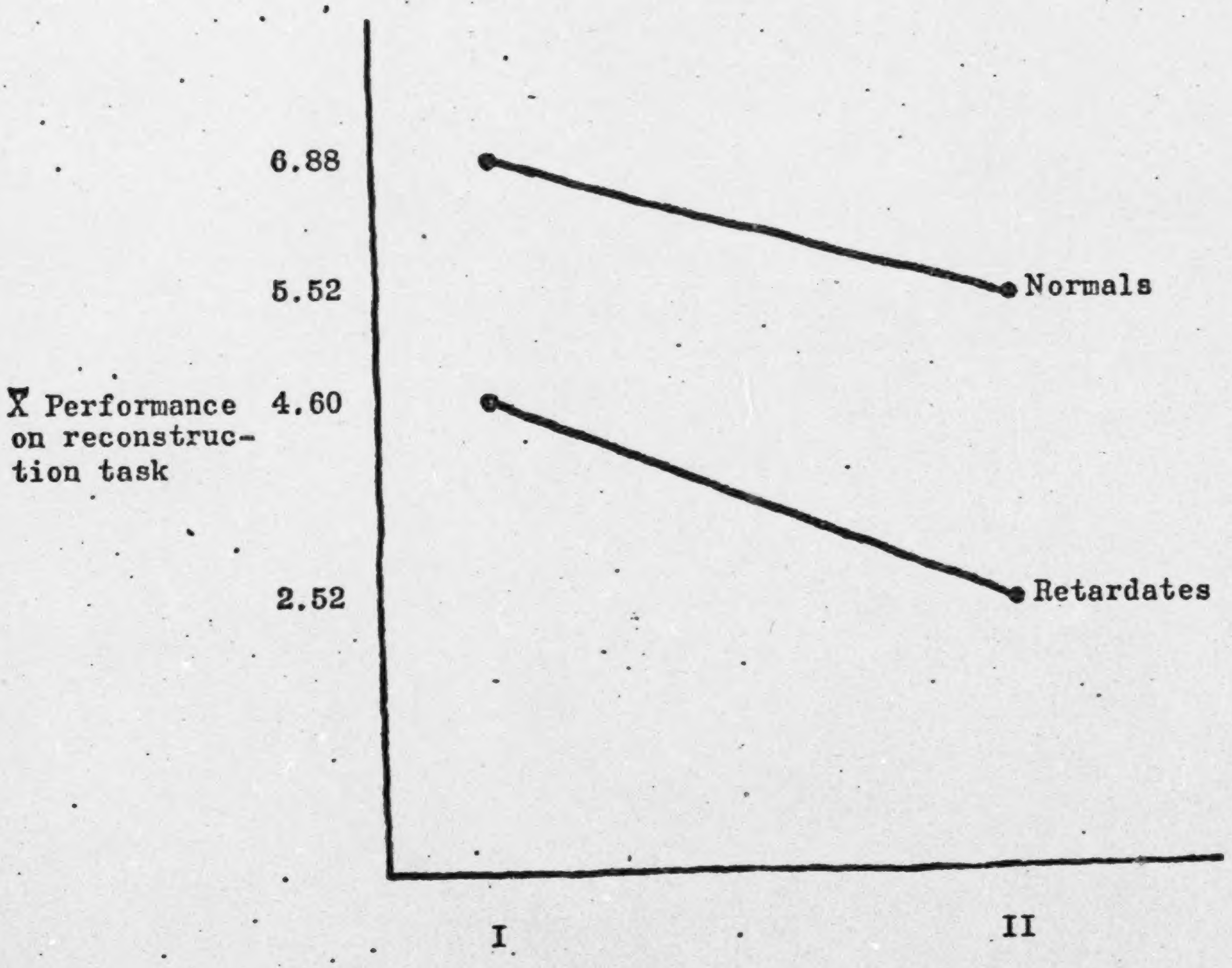


Figure 3

Mean performance for normals and retardates on the reconstruction tasks - one week (I) and six months (II).

The Utilization of an Interactive Unit in the Teaching of Arithmetic to Handicapped Children

Interactive Unit

The interactive unit provides the basis for the expected behavioral characteristics of the arithmetical instructional model. It is horizontally divided into two major sections, the input (the instructor) and the output (the learner). The instructor can be a teacher, an assistant or a teacher. The roles, as indicated by the arrows, are reversible. (see Figure 1)

The unit is vertically divided into three major sections. These are simply listed as Do, See and Say. In more elaborate systems these cells might be referred to as manipulative, pictorial and verbal, or enactive, iconic and symbolic. Because the current model is presented as a continuous recycling of the cells, rather than a cognitive hierarchy along which a child proceeds, it seems valid to utilize the more simplistic reference system. Secondly, the vertical cells are intended to indicate a behavioral characteristic.

The Do level is the basic manipulative level. This requires the designated source, the instructor, to perform a task such as to construct, arrange, sequence and organize the stimulus materials. If the learner is coded in the Do cell, then he is expected to replicate the procedure presented by the instructor. The instructor is cognizant of the fact that his behavior is at the Do level and that the response of the learner will be judged to be correct only if he has "constructed" the model to a reasonable facsimile to that of the instructor. An observer (e.g., a supervisor) would expect to see the instructor actually performing an activity and the learner responding in a similar manner. In effect, Do, does.

Throughout the model, Do refers to construction, arranging, piling and so forth, regardless of whether the materials are three dimensional (e.g., blocks, cars or other objects) or two dimensional (e.g., pictures of cars). In this system, we utilize an extensive array of 2" x 2" cards with pictures on them. If the expected behavior is for the learner to arrange pictures, that is to manipulate, this is assigned to the Do level.

The See level also operates independently of the two- or three-dimensional nature of the instructional materials. The learner is presented with a visual standard by the instructor and he points to or marks the correct response from among a set of choices. The instructor might show the learner two rows of little cars. He would then show the learner a standard, another row of cars, and say, "Which one is like mine?" The learner need only point to one of the response choices. While there is a certain motor response (e.g., pointing, marking) there is no requirement to Do.

The Say level used spoken or written language. The instructor presents the stimulus in a symbolic manner, "How much is two and two?" The learner responds, "Four". In workbooks or texts, the typical Say level tasks utilizes numerals (e.g., 2 + 2 = ?) or printed verbal problems. The use of the spoken and/or written presentation of the more symbolic (e.g., symbols such as the symbols for number operation, x, +, ÷, –, numerals, word names) enables the instructor to present tasks to youngsters who can not read, as well as to youngsters who can.

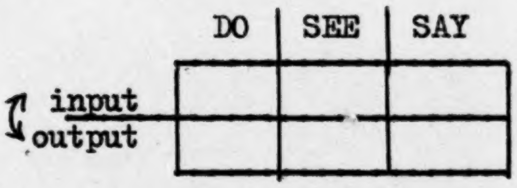
The model provides nine cell combinations through which similar, and often equivalent, learning experiences can be conducted. The instructor can function at the Do level and the learner can respond at the Do, See or

Say levels; the instructor can function at the See level and the learner can respond at the Do, See or Say levels; the instructor can function at the Say level and the learner can function at the Do, See, or Say levels.

The variety of instructionally focused behavioral aspects of the model provide an opportunity for the instructor to circumvent specific disabilities during arithmetical instruction. For the non-reader, learning activities can be made independent of reading; for the child with a language disability, there are other channels of communication; for the child with affective needs, the instructor has a variety of means through which meaningful relationships can be established.

The decision to present the interactive model as non-hierarchial was based upon the proposition that the cells must be viewed as an "interchangeable" arrangement. While in most systems, the Say level, which depends upon the use of symbols is ordinarily viewed as representing the highest developmental level, the instructional practices for many handicapped children are such that the symbolic representations are frequently rote and meaningless. Handicapped children, particularly those handicapped via developmental status in the broad area of intellect, practice meaningless symbolic responses. Instead of the continuous use of rote learning in the drill sheets of a workbook (e.g., 2 + 2 =?), the instructor might ask the learner to prove that 2 + 2 = 4. Thus, the Do or See levels might actually show a higher order level of behavior.

It seems essential, whenever possible, regardless of chronological age, that instruction begin at the Do level and that the stress should be on the development of ideas, principles and processes, rather than solely on computational products (Cawley & Pappanikou, 1967). Furthermore, the role of the instructor and the learner must be interchangeable. The interactive unit provides for this and it provides for a variety of differentiated relationships between instructor and learner.



	DO	SEE	SAY
input			
output			

FIGURE 1 - INTERACTIVE UNIT

The Verbal Information Processing of Educable Mentally Retarded Children on Quantitative Verbal Problems*

(CEC Presentation, Washington, D.C., 1972)

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It is fairly well documented in the literature that the educable retarded child attains mental age expectancy when one discusses computational abilities. When one discusses verbal problem-solving however, the situation is different. What little is available in terms of research indicates that the retarded child manifests inadequate verbal problem-solving skills. This is especially true when the retarded child is presented with verbal problems containing extraneous information.

There are several reasons for the poor problem-solving abilities of EMR children. To begin with, children in special classes are rarely exposed to quantitative verbal problems. The stress has been placed on computation with resulting de-emphasis of verbal problems, thus making computation an isolated and thus meaningless skill. A possible explanation of the existing discrepancy between the retarded child's performance on verbal problems and his computational skills may thus reside in the function of the curriculum to which he has been exposed. If all a child is taught is how to add 3+4, 5+3, 7+1, or for that matter, 6,321 + 7,326,521 etc. for 12 years of schooling, not surprisingly, the performance on verbal problems will not develop. A second contributing factor in explaining the poor performance of retarded children on verbal problems lies in the inappropriateness of many materials currently used with special education classes. For instance, surveys of the content of several standardized math series used in classes have indicated that: (1) vocabulary is not controlled; an average of 4 to 7 new words are introduced per page and sometimes frequency counts have gone as high as 40 to 60 new words per page; and (2) the reading level of the texts used are usually 2 years above the grade level in which used. The parallel increase of mathematical difficulty makes fairly obvious the problems retarded children will face, ...and fail.

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A major component of the arithmetic project at the University of Connecticut has been with the development of verbal problems controlled for syntactical difficulty, vocabulary, and mathematical difficulty in terms of computation. The following represents some of the techniques with which we have been dealing:

(1) Extraneous Information- Refers to a subject, object, or phrase distractor which need not be considered in obtaining

the correct answer to the verbal problem. We have defined two basic types of distractors, i.e., qualitative and quantitative. The qualitative distractor refers to an irrelevant set, that is, a set not called for in the solution of the problem. A quantitative distractor refers to a superfluous number value. The quantitative distractor can only be used when the problem presented to the child is accompanied by iconic representations of the problem.

(2) Indefinite Quantifier-The indefinite quantifier is a non-specific numerical element that directs the learner to the totality of a subset. Words such as "some", "many", "few", etc. are indefinite quantifiers requiring the child to identify the cardinal property of the subset, identify the operation and compute the answer. A limitation of the indefinite quantifiers as with the quantitative distractors is that it can only be used with pictures or objects where the child must scan the information presented to him and place a value on the computational data. The reason for the use of the indefinite quantifier is to interfere with the retarded child's rote processing of numerals in verbal problems, and to direct the child to identify the quantitative properties to which a numeral can be affixed.

(3) Neutral Question-The use of neutral questions minimizes the use of the question as a means of identifying the number operation necessary to solve the problem. Again, the rationale for using the neutral question is to force the child to process

information contained in the problem, rather than relying exclusively on such cue words as "altogether", "in all", "left over", etc.

(4) Indirect Problem- In many of the problems given to retarded children, there is an abundance of cues which supposedly are to aid the child in solving problems. Examples of such cues, in addition to those mentioned above, would be words such as "remaining", "taken away", and others. The use of such cues, especially when used extensively, should be looked at critically for the following reasons: (1) They reinforce rote procedures; (2) They emphasize computational set; and (3) they de-emphasize information processing.

Currently at the University of Connecticut, we are developing a*verbal problem hierarchey and a corresponding computational matrix which will allow us to construct verbal problems controlling for syntax, vocabulary, and arithmetical difficulty. The use of a verbal problem hierarchy in combination with the computation matrix may act as a diagnostic measure with regard to a child's ability in verbal problem-solving and it is also one means of record keeping with regard to a child's progress. In summary, children of varying ability in reading and mathematics need not be neglected. The use of the techniques discussed above should provide sufficient opportunity to develop the very important skills of verbal information processing.

*See attached sheets for examples of verbal problem hierarchy and the computational matrix.

Figure 1

Model for a Linguistic Hierarchy For the Construction of Addition Problems

	Article	Adjective	Subject	Preposition	Verb	Number	Adjective	Object	Preposition
1.	☒		☒		☒	☒		☒	
2.	☒	☒	☒		☒	☒		☒	
3.	☒		☒		☒	☒	☒	☒	
4.	☒		☒		☒	☒		☒	☒
5.	☒	☒	☒		☒	☒		☒	☒
6.	☒		☒		☒	☒	☒	☒	☒
7.	☒		☒	☒	☒	☒		☒	
8.	☒	☒	☒	☒	☒	☒		☒	
9.	☒		☒	☒	☒	☒	☒	☒	

CHECKLIST FOR WORD PROBLEMS

Part	Problem Numbers									Process: Addition
I-A	1	2	3	4	5	6	7	8	9	1 digit number +1, sum less than 10. (like 8 + 1 = 9)
I-B	1	2	3	4	5	6	7	8	9	1 digit number + 1 digit number, sum less than 20. (like 7 + 8 = 15)
I-C	1	2	3	4	5	6	7	8	9	1 digit number + 2 digit number, sum less than 20, no carrying. (like 6 + 12 = 18)
I-D	1	2	3	4	5	6	7	8	9	2 digit number + 2 digit number, no carrying. (Like 12 + 14 = 26)
I-E	1	2	3	4	5	6	7	8	9	1 digit number + 1 digit number + 1 digit number, sum less than 10. (Like 4 + 2 + 3 = 9)
I-F	1	2	3	4	5	6	7	8	9	3 digit number + 3 digit number, no carrying. (Like 113 + 136 = 249)
I-G	1	2	3	4	5	6	7	8	9	2 digit number + 2 digit number, or 2 digit number + 1 digit number, sum less than 40, (Like 17 + 14 = 31) with carrying)
I-H	1	2	3	4	5	6	7	8	9	1 digit number + 1 digit number + 2 digit number, or 2 digit number + 2 digit number + 1 digit number, with carrying. (Like 3 + 6 + 12 = 21)
I-I	1	2	3	4	5	6	7	8	9	2 digit number + 2 digit number, carrying in units. (Like 12 + 19 = 31)
I-J	1	2	3	4	5	6	7	8	9	2 digit number + 2 digit number, carrying in tens. (Like 42 + 71 = 11)
I-K	1	2	3	4	5	6	7	8	9	2 digit number + 2 digit number, carrying in both columns. (Like 96 + 28 = 124)

APPLICATION OF LEARNING THEORY TO THE EVALUATION OF LANGUAGE DEVELOPMENT IN YOUNG RETARDED CHILDREN

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Paper presented at 50th
Annual International Convention
The Council for Exceptional Children
Washington, D.C.
March 24, 1972

Recent reviews of research reveal that there have been few investigations of specific language behavior with severely retarded children. Studies concerned with language abilities and efficacy of language programs are notably lacking on children with IQ's of 50 or less. Further, there are few procedures which are suitable for use in assessing the language competencies of these children.

In the realm of language evaluation, the more recent tests of language development have not shifted the emphasis from normal language development to include the mild or severly language handicapped child. There is need for newer diagnostic tools more closely related to conditions of learning and instructional methods, the value of which should be of immediate relevance to the classroom situation of teaching language.

A summary of the problems involved in the study of language development and language behavior reveals the following:

(1) There has been lack of consensus on a comprehensive theory of language;

(2) The severely retarded population has a high prevalence of deviant and non-adaptive behavior;

(3) The slow rate of language learning by severely retarded children has been generalized into an assumption that they do not profit from language instruction; and

(4) There is a lack of objective scales of measurement and adequate measuring instruments.

In an attempt to analyze more closely the process and conditions under which retarded children learn language, the author constructed a language behavior inventory (Bowen Language Behavior Inventory, 1971) which incorporated five theoretical types of learning. These types of learning were selected from a theoretical hierarchy of eight learning types presented by Gagne (1965).

The five types of learning which were selected for representation in the language inventory are stimulus-response, chaining, verbal association, multiple discrimination and concept learning. The eight subtests which comprise the language inventory are (1) Stimulus-Response, (2) Motor Imitation, (3) Vocal Imitation, (4) Chaining Objects, (5) Chaining Actions, (6) Verbal Association, (7) Multiple Discrimination and (8) Concept Development. Collectively, these subtests form a language inventory describing five levels of language learning. The learning type-subtest relationship is shown in Table I.

TABLE I
SUMMARY OF LEARNING TYPES AND REPRESENTATIVE SUBTESTS

Type of Learning	Subtest
Stimulus-Response	1. Stimulus-Response
Chaining	2. Motor Imitation
	3. Vocal Imitation
	4. Chaining Objects
	5. Chaining Actions
Verbal Association	6. Verbal Association
Multiple Discrimination	7. Multiple Discrimination
Concept	8. Concept Development

Description of Subtests

The various subtests may be described as follows:

Language Behavior Inventory Subtests:

Stimulus-Response - This is the first subtest in the language inventory. A primary concern at this level of examination is to determine in very general terms, an answer to the question, "How well does the child attend to familiar objects in his environment?" A variety of items were selected for inclusion which are representative of objects common to home and school settings. Items include objects representing toys, clothing, grooming and food.

Motor Imitation - The first of four types of chaining, this subtest is directed to the question, "To what extent can the child imitate a series of non-meaningful motor movements?" Non-meaningful movements were adopted in an attempt to lessen the effects of experience.

Vocal Imitation - The question asked at this level of examination is "How well can the child imitate a series of non-meaningful speech sounds of increasing complexity?"

Chaining Objects - The information desired at this level of examination is, "How well can the child demonstrate receptive knowledge of various functional actions?" In this subtest, the child demonstrates his knowledge the way he manipulates specific objects.

Chaining Actions - The information desired at this level of examination is similar to that for the Chaining Objects subtest. However, the receptive knowledge must be demonstrated without the use of specific objects. The method of presentation is as follows: "Show me (drinking; throwing, etc.)" in which the child demonstrates the appropriate action(s) without the physical presence of a related object.

Verbal Association - The question asked here is "Can the child provide a label for something he sees?" Expressive language is required of the child in that he is expected to provide a name or label.

Multiple Discrimination - The question asked at this level is "From a field of similar objects, can the child demonstrate a critical object and point to it?" This is a task of receptive rather than expressive language ("Show me the ____.")

Concept Development - The question asked at this level of examination is "Can the child apply a classification or group label to an object in a field of dissimilar and unrelated objects?" This is also a task of receptive rather than expressive language and is presented in the same way as the Multiple Discrimination items.

Results

The Language Behavior Inventory was administered to 160 children between the ages of six and one-half to ten with Stanford-Binet IQ's from 35 to 55. The following are major findings of the preliminary validity and reliability studies:

(1) Significant sex differences were observed on only one subtest (Chaining Actions).

(2) IQ was significant as a source of variance for all subtests.

(3) Age was significant as a source of variance on all subtests with the exception of the Stimulus-Response subtest.

(4) Mean scores demonstrated a linear progression with age for the Verbal Association, Multiple Discrimination and Concept Development subtests. For the remaining subtests, the trend of mean scores was generally upward for the six, seven and eight year old groups.

(5) Reliability estimates were relatively high for all the subtests. The range of coefficient values was from .61 to .89.

(6) Intercorrelations among the various subtests were moderately low when CA was controlled by partial correlation.

Implications

A major point to be made is that functional language behaviors, e.g., gesture, imitation, receptive language activities, can be defined and measured under standardized procedures. That is, such activities can be ranked, ordered and evaluated in formal as well as informal settings.

The task analytic approach for scoring, used on three of the four subtests, appears to offer promise as an alternative method for analyzing and scoring criterion related performance. This method offers variable credit for task performance, thus eliminating the "all or nothing" approach to scoring.

In this study an experimental application of a theoretical hierarchy of learning types was used to describe language behaviors. The developmental arrangement of the hierarchy appeared to differentiate language behaviors at various age levels and across a limited range of intellectual ability. Further applications of this type of language categorization are encouraged in other areas such as curriculum planning and remediation activities.

Bowen, M. L. *Some procedures for evaluating language development in young retarded children*. Doctoral thesis, University of Illinois. Ann Arbor, Michigan: University Microfilms, 1971.

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Council for Exceptional Children

March, 1972

USE OF A MUSIC ACTIVITY AND SOCIAL REINFORCEMENT TO INCREASE GROUP ATTENDING BEHAVIOR

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Music and social reinforcement increased group attending behavior of trainable retarded children. The procedure involved five components: (1) baseline percentage of attending, (2) presenting social reinforcement contingent on attending, (3) presenting music and social reinforcement concurrently when attending reached criteria, (4) measuring the effect of withdrawing reinforcement contingent on attending, and (5) increasing attending by reinstating reinforcement. During Baseline_1, attending was 52%; when social reinforcement was contingent on attending, the behavior increased to 62%. Concurrent application of music and social reinforcement produced an increase in attending to 96%. A measurement tactic was programmed which enabled teachers to observe and record group attending behavior while the teacher continued to conduct the activities.

One concern of educators is inappropriate attending behavior. Inappropriate attending behavior may interfere with learning or be directly related to other behaviors which disturb skill acquisition. Educators may find that as attending behavior is increased, other inappropriate behaviors decrease.

Applied behavioral analysis has demonstrated procedures to increase attending behavior. For example, contingent teacher attention was found to increase attending behavior of two boys described as extremely disruptive (Broden, Bruce, Mitchell, Carter, and Hall, 1970). The control of classroom attending was demonstrated by applying contingencies dependent on the attention of every student in a class.

Instructions concerning attention produced temporary increases for some students, but token-mediated reinforcement raised group attending to 70-85% (Packard, 1970). In another study, a fourth grade boy's attending behavior was increased by employing points exchangeable for model cars if he met the criteria for attending (Walker and Buckley, 1968).

The above studies are examples of successful attempts to increase attending behavior with one or two children and four elementary classes. The group attending study indicated that specific procedures were required in order to raise attending.

A class of six children functioning at the trainable level of retardation were referred for music therapy by their teacher. These children attended a private school for trainable retarded children and ranged in chronological age from three to six. All children were ambulatory. Four were non-verbal. The teacher suggested that group participation be the main goal for the class. For three pre-baseline sessions, a variety of music activities were presented to the children. General observation during these sessions revealed that the children did not remain in their chairs for more than fifteen minutes during a thirty minute session. When in their chairs, they seldom looked at the therapist or attended to the activity. It was apparent that group participation could not be obtained until attending behavior was increased.

Defining and Measuring Attending Behavior

Attending behavior was defined as sitting in a chair at a desk and looking at the therapist and/or in the direction of the activity. Once attending behavior was defined, a method of measuring the behavior was determined. Because no observers were available during the activities, a tactic was devised to conduct activities and record behavior without assistance from another person.

Songs and activities were timed and ten second intervals within each song and activity noted. Cues for ten second intervals within each activity were memorized by the therapist. For example, in the song "Twinkle, Twinkle Little Star" (at a slow tempo), ten second intervals occur at the words "high" and "wonder".

Each child was observed for a ten second interval and a check mark ( ) was placed under each child's name if he were attending during the ten second period. If he were not attending, an X (X) was placed under his name. Recording continued throughout the sessions, i.e., a mark was placed under a child's name without stopping the activity. Throughout the thirty minute sessions, each child was observed approximately thirty times per session. Table 1 is a sample observation chart showing the method of recording attending behavior for six children.

	*John	Laura	Alicia	Daryl	Mary Ann	Scott
1.	X	✓	✓	X	X	✓
2.	✓	✓	X	✓	✓	X
3.	X	✓	✓	X	X	✓
4.						
5.						
6.						

*Each child's name represents 10 seconds

Setting

This study was conducted in a classroom of a private day school for trainable retarded children. Students had desks with attached chairs. A large play area was located in the back of the class where group activities were held.

Music Activities

During pre-baseline sessions, a variety of music activities were presented. Music activities in which the greatest amount of participation occurred were chosen for this study. All songs and activities contained actions and/or movements. If songs did not have actions, stamping, clapping, or some other movement was added. The same songs and activities were presented throughout the study. Some of the songs and activities used were: "Put Your Finger in the Air", "These are My Ears", "The People on the Bus", "Johnny Plays With One Hammer", "Six Little Ducks", "Little Cottage in the Woods", "Little Rabbit Foo Foo", "Hokey Pokey", "She'll Be Coming Around the Mountain", and "Let's Make a Garden".

Procedure

Baseline$_1$: During the first four thirty minute sessions attending behavior was observed and recorded. No reinforcement was presented contingent on attending behavior. Intermittent social reinforcement consisting of "Good girl" or "Good boy" was given when ever a child sang or performed a movement in a song.

Social Reinforcement: Social reinforcement contingent on attending behavior was given each child during each ten second observation period during the next four sessions.

Social reinforcement consisted of touching a child and saying, "Good boy or good girl, you're a good listener".

Music and Social Reinforcement$_1$: Social reinforcement continued to be given contingent on attending but concurrently, music was presented contingent on attending behavior. The music activity "New Red Drum" was chosen as a reinforcing activity. This activity had a high probability of functioning as a reinforcer because the children participated almost 100% when "New Red Drum" was presented during pre-baseline. Thus, a preferred activity, "New Red Drum", was presented immediately following a low frequency behavior - attending (Homme, Debaca, Devine, Steinhorst, and Rickett, 1963). The reinforcing activity consisted of individuals marching around the room with the therapist as she and the children sang the song "New Red Drum". This activity was presented six times within each session; therefore, five minutes of attending behavior was required before a child was allowed to participate in the reinforcing activity. Social reinforcement continued every ten seconds for each child if he continued to attend. If a child did not attend for a five minute interval, he remained in the room but was not allowed to participate in the reinforcing music activity.

Baseline$_2$: Two sessions were conducted in which no reinforcement was presented contingent on attending. These sessions were used for scientific verification of the behavior change. Baseline$_2$ employed the same procedures as Baseline$_1$, i.e., social praise consisting of "Good boy or good girl" was given intermittently when a child participated, but no reinforcement was presented contingent on attending.

Music and Social Reinforcement$_2$: During the final two sessions, reinforcement was reinstated. Both social reinforcement and the reinforcing music activity were presented contingent on attending behavior.

Results

During Baseline$_1$, the class met the criteria for attending 52% of the time (see Fig. 1). Individual attending behavior ranged from 0% to 90%. For the next four sessions, social reinforcement was contingent on attending behavior. Group attending averaged 62% during this condition with individuals ranging from 12% to 100%. To further increase attending behavior, a reinforcing music activity was presented concurrent with social reinforcement. The group attending behavior increased to an average of 96%. Individual attending ranged from 70% to 100% with four of the six children maintaining 100% attending for the three sessions of Music and Social Reinforcement$_1$.

During Baseline$_2$, no music reinforcement was given for attending, but intermittent social reinforcement was presented for participation. Attending behavior decreased for all children. The class decreased to an average of 52% with three children attending 20% of the time for one of the two sessions.

For the final two sessions, both the contingent social reinforcement and music activity were reinstated. The group increased to an average of 96% attending with every child attending 100% for at least one of the two sessions (see Fig. 1).

Discussion

The date indicated that contingent social reinforcement presented concurrently with a music activity increased attending behavior. However, attending increased 46% from the baseline percentage with the concurrent application of social and music reinforcement.

When this contingency was withdrawn, the behavior returned to baseline level, thus increasing the probability that change in behavior was effected by reinforcing consequences rather than by chance variables.

The present study demonstrated the effectiveness of using a music activity paired with social reinforcement to increase group attending behavior. In addition, it provided an example of how data can be obtained by the same person who conducts the activities. One frequent objection to behavior modification techniques is the necessity for observers. The observation and recording techniques presented in this study were done without observers. Also, educators who receive limited observer assistance would find these observation tactics useful. This method of observation could be applied to many situations in addition to music activities. Any teacher directed presentation could be timed and the teacher could memorize the cues for ten second intervals or any timed interval he chooses.

Although this study demonstrated how group attending behavior was increased in trainable children, the teaching tactics could be utilized with children of various levels of functioning. Social reinforcement alone was not sufficient to increase attending to criterion. However, social approval, praise, and attention were paired with the music activity in the hopes that in the future a high percentage of attending could be maintained by these "natural" reinforcers.

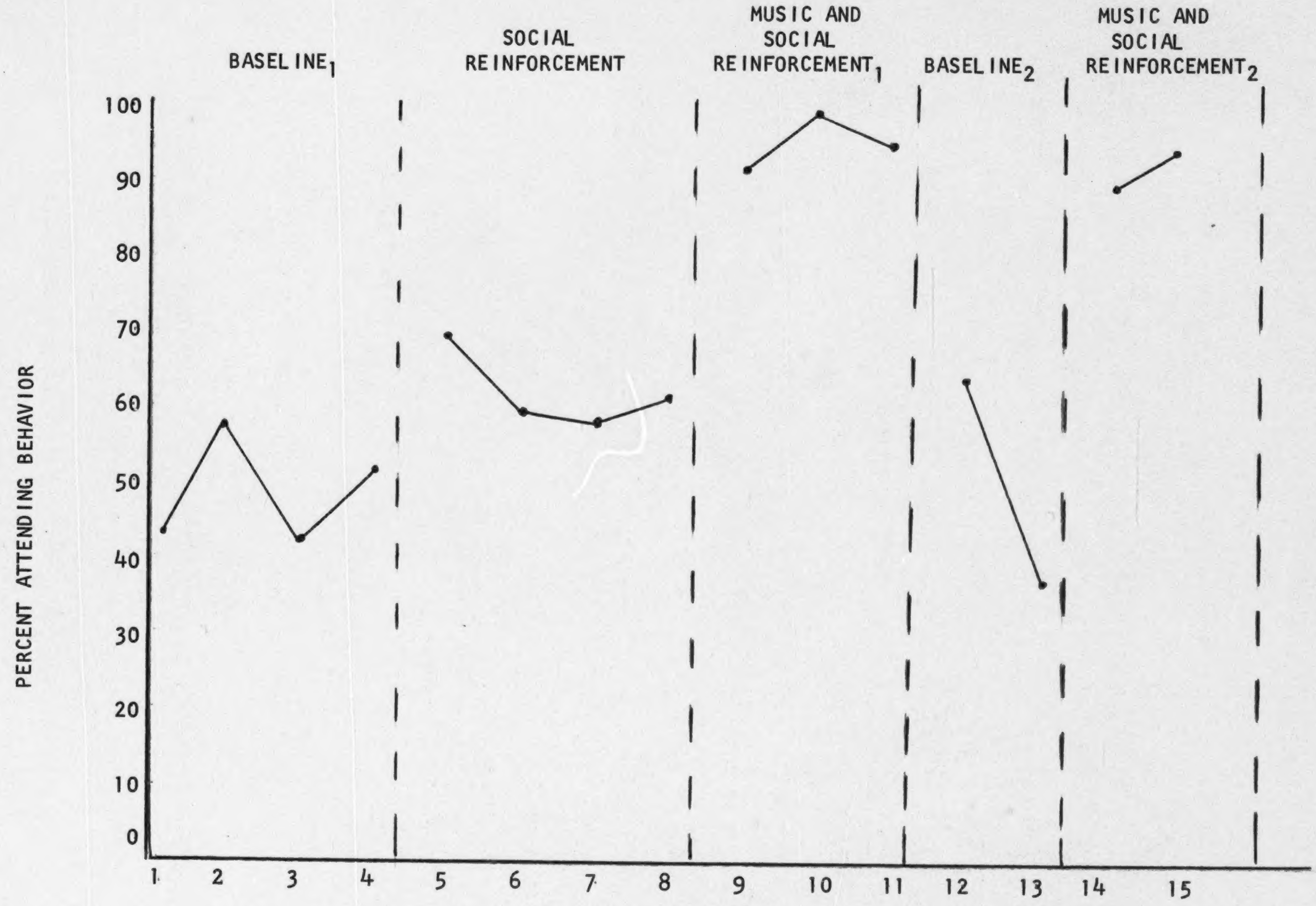

Fig. 1. Percentage of group attending behavior over 15 sessions. Baseline$_1$ and Baseline$_2$ consist of no reinforcement for attending behavior, intermittent social reinforcement for group participation. Sessions 5-8 social reinforcement was contingent on attending. Reinforcing music activity and social reinforcement were contingent on attending for sessions 9, 10, 11, 14, and 15.

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The First Year of the Down's Syndrome Preschool Program: Objectives, Procedures, and Results.

Valentine Dmitriev,Coordinator, Down's Syndrome Program
Experimental Education Unit
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January 1972 marked the first year of the Down's Syndrome preschool program at the Experimental Education Unit of the Child Development and Mental Retardation Center, University of Washington. School began with eleven children ranging in age from 18 to 36 months. The class met four days a week for one-and-a-half hours. The staff consisted of a coordinator, a teacher, and an assistant teacher. Mothers of enrolled children participating one day a week and varying numbers of students receiving practicum training served as teacher aides and observers.

The rationale for this program was based upon the belief that one of the weaknesses of special education programs generally is the limited attention directed toward working with very young children sometimes considered as "trainable" or severely retarded. In the past, many of these children were placed in institutions. There is now a movement to have parents keep these children at home, and to provide for such children in school programs in accordance with the recent legislation of Education for All. However, existing legislation does not provide for the education of children younger than six years. Early intervention with these children, and work with their parents, seem essential if parents are to keep these children in the home. Pilot investigations at the Experimental Education Unit related to this project point to the necessity of further development and testing of programs

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Paper presented at the 50th Annual International Convention of the Council for Exceptional Children, Washington, D.C., March 23, 1972.

for this population.

It was therefore considered important to develop a program designed to determine the needs of young retarded children and their parents. It was also important that this program be subject to systematic investigation and evaluation and thus provide an effective "transferable model" which could be used in schools, institutions, and home settings.

A preschool program for young Down's Syndrome children seemed to fulfill these requirements. First, the incidence of Down's Syndrome, a genetic anomaly commonly known as mongolism, is relatively high, approximately 1 in 600 births being so diagnosed. Second, Down's Syndrome children comprise 1/3 of the entire population of children classified as trainable (Dunn, 1965, p. 134). Although a homogenous group, there is a wide individual range of differences among these children physically, mentally, and behaviorally. Yet their most common and pronounced developmental deficits in the areas of locomotion and language are generally symptomatic of retardation. In some children, however, where the egiological cause for retardation is unknown, the developmental handicaps may not be recognized before the ages of two or even three years. The Down's Syndrome child, on the other hand, can be identified at birth, which makes early intervention possible. Furthermore, the traditional educational prognosis for these mongoloid children has been pessimistic, as indeed it has been for all children classified as "trainable." Therefore procedures that provide accelerated development and remediation for the Down's child may well be applicable to and effective in helping other children showing similar problems.

Objectives

The objectives of the program were as follows:

1. To enable trainable preschool children to function independently in a non-institutional environment.

2. To develop specifically defined skills related to physical, intellectual, and social development.

3. To give classroom practicum and training to parents which would enable them to apply teaching and management procedures at home.

4. To give classroom practicum to students and teachers in special education.

5. To keep continual measurement on the children's progress and to base all decisions and teaching activities on data.

6. To disseminate information about this project through progress and annual reports, in published articles, slide-tape script sets, in workshops, and in-service training conferences.

Procedures

1. Identification of Sequential Development and Target Behaviors.

The first task in setting up a program for the young trainable retardate was to identify the sequential developmental steps in each of the aforementioned areas: physical, intellectual, and social development. Using developmental scales as a guideline to determine the sequential development of gross motor skills it was found, for example, that between the time that he lies helpless in his crib and the time that he takes his first independent steps a child must master the following gross motor skills:

1. He must be able to roll from his back or stomach to a sitting position.
2. He must be able to sit unsupported, with a straight back, for indefinite periods of time.
3. He must be able to shift from a sitting position to a crawling position, and back to sitting.
4. He must be able to creep, crawl, scoot or roll across the floor.
5. He must be able to pull himself up from sitting or kneeling to a standing position.
6. He must be able to stand with support.
7. He must be able to take steps with adult support.
8. He must be able to cruise: walk around a play-pen or about a room holding on to the furniture.
9. He must be able to stand without support.
10. Finally, when he has achieved all of these rerequisite skills, a child is able to walk without support. (Gesell, 1969, Cratty, 1969)

Five sequential steps deemed necessary to the development of fine motor skills were identified as looking and focusing, reaching, grasping, holding, and releasing.

In the area of intellectual development the requisite skills for academic learning and the acquisition of language were listed as follows:

1. Attending skills: the ability to remain seated at a table or desk for a specified length of time and to maintain eye contact with the teacher or materials.

2. Dextrous skills of reaching, holding, and releasing, e.g., the controlled, accurate placement of objects into their proper positions--rings on a stick, pegs into pegboard holes, shapes and puzzle pieces into form boards.
3. Matching skills--the ability of match colors, shapes, and pictures.
4. Receptive language skills: the ability to follow verbal directions.
5. Expressive language skills--the ability to communicate non-verbally by means of eye-contact, gestures, grunts, approximations to speech, and finally, understandable speech.
6. Imitative skills--the ability to imitate modeled behaviors.

As stated, social development was the third major objective of the preschool program. In order to function appropriately as an independent social being it was believed necessary for a child to acquire basic self-help skills in the areas of dressing, personal hygiene, and eating, and to learn appropriate peer interaction.

For the first year of the project specific traget behaviors in each of the major areas of self-help, dressing, personal hygiene and eating were selected.

Under the category of dressing the goal was to teach coat removal and attendant locker skills.

Under personal hygiene the focus was on toilet training and developing hand-washing skills.

Eating of crackers, drinking from a cup, and the use of appropriate communicative skills were the target behaviors selected under the general category of eating.

The sequential development of social interaction with peers was identified as:

1. Appropriate use of equipment and materials in solitary play.
2. Parallel use of equipment and materials within a group of children.
3. Cooperative play with one or more children in the shared use of equipment and materials, physical, and verbal contact.

II. Assessment of Children.

After the general target behaviors had been identified it was important to assess each child's entering behavior. In order to do this each new child and his parents came for an initial visit when no other children were present. At this time the requirements and goals of the program were explained to the parents and the child's strengths and weaknesses in physical, mental, and social development were noted. Twice a year all children in the program were given a Denver Developmental Screening Test. Individual and group programs were based upon these evaluations and other data.

III. Curriculum and Teaching Procedures.

Our next objective, once the developmental steps had been identified and the children assessed, was to implement procedures toward the attainment of target behaviors. All the activities as well as the classroom itself were geared to this end. Every aspect of the preschool curriculum was programmed in accordance with the desired sequence of development for individual children as well as for the entire group. Activities, equipment, materials, staff assignments and the children, themselves, became an integral part of the teaching and learning experience.

In order to give all the children an equal opportunity to participate in each of the previously designated areas of physical, mental, and social development, related activities were incorporated into the daily schedule as follows:

1:00 pm   Arrival and routine practice in locker skills.

Teaching procedures and data collection.

Locker and coat removal skills were broken down into seven steps, e.g., coming to the locker area, finding own locker (designated by a picture and child's name), pulling off sleeve, pulling off second sleeve, removing coat, placing coat in locker, hanging coat on hook. A verbal cue was given for each of the seven steps: "Find your locker," "Pull your sleeve," etc. If the desired response did not occur, the verbal cue was repeated and the child was physically aided in making the response by guiding the child through the proper motions. As these tasks were performed data were taken on the number of aided and unaided, spontaneous responses. The percent of group and individual unaided responses was computed daily, the goal being that all children would attain 85-100% independent competency.

1:00 - 1:45 pm Gross motor and fine motor development, individual concept learning, toileting and hand-washing.

All of these activities were scheduled concurrently. The children were required to participate 10 to 15 minutes in each activity every day.

Moreover, each project was programmed to meet individual needs and to foster general social development.

1. The gross motor program.

Initial assessments showed that all the children in the preschool were able to sit without support. Four were at the crawling stage. Three were walking with varying degrees of support and four were walking independently.

In planning for the continued evelopment of these capabilities and keeping with the outlined developmental sequence the following individualized activities and exercises were included in the daily gross motor program.

1. Standing. Standing was considered a vital developmental function, not only as a prerequisite for walking but as an activity that strengthened leg and back muscles and taught balance, control and endurance. In order to encourage standing, children stood at waist-high tables for such creative and fine motor activities as water play, dough, or finger painting. Those who were still wobbly on their feet received adult support and stood only as long as they were able to do so without fatigue.
2. Sitting to Standing. Children who did not stand readily received daily training in pulling themselves up to a standing position. They sat on a block and rose to standing by (a) grasping a dowel held by a teacher and/or (b) grasping the edge of a low table and pulling upward. Note: the child was not pulled to his feet by the adult. The child was taught to stand by straightening his knees and by raising his torso from the hips. Each correct response

was praised enthusiastically. The exercise was repeated several times during a ten-minute period.

3. Walking with Support. Children who needed this type of experience were walked at every opportunity. The child with minimal skill was supported under the arms and elbows; those who were ready for less support were held by one or both hands. The teachers were careful not to pull the children's arms up above their heads.
4. Board Walking. Every child in the group was given practice in walking the length of an 8' x 8" board. Board walking proved to be an excellent exercise, appropriate at all stages of walking. The narrowness of the surface encouraged the children to look where they were stepping and to attend to how they were placing their feet. Many of the beginning walkers had a wide, straddling gait. Walking the board taught them to keep their legs closer together and to take "forward" steps. Initially even the fairly skilled independent walkers found the board to be a challenge and were unable to walk its length without stepping off the edge or without some adult help.
5. Advanced Exercises. Advanced exercises offered practice in walking or crawling up inclined boards, sliding down boards, stepping over obstacles, and stepping on or off a block, and trike riding.

Fine Motor Development and Social Interaction.

Additional creative and manipulative materials such as crayons, paste and paper, blocks, puzzles, pegboards, and similar educational toys, as well as a well-equipped doll corner gave the children various experiences in eye-hand coordination, fine motor development, and social interaction with peers.

Individual Concept Learning.

Each child was assigned to a teacher or a trained student for one-to-one instruction in concept learning for about 10 minutes, two to four times a week. During this time attending skills, reaching and grasping, pointing, placing, matching, language and other pre-academic skills were increased. Data were taken on the number correct responses, errors and assisted responses. The rate over time of correct responses was also recorded. Generally the children worked for social reinforcement, although with some it was necessary to resort to a primary food reinforcer as well.

Toileting and the Development of Hand Washing Skills.

Teaching procedures and Data Collection. Seven children participated in the toilet training program. These were children who were able to come to school in training pants. Daily data were kept on each of these children. Three things were recorded on a chart kept conveniently in the bathroom: time of toileting, whether the child was wet or dry, and whether or not he urinated when placed on the toilet.

Handwashing skills consisted of a ten step sequence: standing on a stool before the sink, touching faucet, turning on faucet, wetting hands, washing hands, turning off faucet, stepping down, taking a towel, drying hands and putting the paper towel in a basket. The same teaching procedures of giving a verbal cue with or without physical aid as were used in teaching coat removal were used in the bathroom. The number of aided or unaided responses for each of the ten hand washing skills were also recorded.

1:45 - 2:00 Snack time: the development of eating and drinking skills,
communicative and imitative skills.

Teaching procedures and data. The children were divided into three groups according to age and ability. A minimum of two adults sat at each table, one to assist and instruct the children and the other, usually a mother, to take data. Eating skills were also divided into ten discrete tasks: verbal sound for cracker, verbal sound for juice, taking (eating defined as biting, chewing and swallowing) a cracker, pouring juice from a pitcher into a cup, lifting the cup, drinking, placing the cup on the table between sips, placing the empty cup on a tray. Again the children were given verbal cues, paired with physical help when necessary. Data were taken on the number of aided and unaided responses. Again the target behavior was an 85-100% independent performance on all ten tasks.

At the end of snack time the children participated in looking at and naming pictures and learning finger plays. The quality and quantity of verbal and imitative responses were recorded.

2:00 - 2:15. Music and Departure.

Children, teachers, participating mothers, and students sat in a circle on a rug for music time. This activity provided a large group experience and another exercise in imitation along with the usual musical experience.

Rhythm instruments such as sticks, bells, drums, and xylophones were used. The instruments were passed to the children in baskets, and they quickly learned the whole routine of selecting, using an instrument, and returning it to the basket when a song was finished. The children also used body rhythms such as clapping, stamping, swaying. Singing games such as "Ring around the rosy" and "Row, row your boat" offered a combined cooperative and gross motor experience.

2:15 - 2:45 Parent and student training.

The last half hour of the day was used for staffing with teachers, mothers, and university students. Examination of the data, events of the day, techniques for observation, recording, behavior modification, and general preschool management were the bases for the daily conversations. Frequently ways of handling problems that a family might be encountering at home were also discussed.

Results

Results showed that all the children who had been in the preschool a year mastered the designated tasks in such social, self-help skills as coat removal, hand-washing and eating with 85 to 100% competency. On other skills such as gross motor, language, and concept development their scores ranged from 39-100%, depending upon the task. The most progress was noted in gross motor development and concept learning and the least in language, although each child showed consistent progress in all three areas.

Eighteen parents and 15 students received training during the year. Videotapes, slide sets and written reports have been prepared for dissemination of information. On the average 20-25 persons visited the preschool every quarter. Ninety-one teachers and volunteers from Epton Day Care centers received practicum experience in the classroom during the year.

Discussion

On the basis of these data one can say that the preliminary goals of the program have been realized, yet much more needs to be done. At the present time there are six children in the group between the ages of 3 and 4. They are ready for more intensive work in language development and pre-academics. The younger children need further training in basic self-help skills and gross motor development. Hopefully the program can be expanded to meet the requirements of both groups and to admit more children. Future plans must include provisions for returning these children to classes in the community, for follow ups and for using and testing this program as a "transportable model" in schools, institutions, and home settings. Only then can it be said that all the objectives of this program have been met.

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The following are speeches given by staff members of Pinkard Court Special Education School in Roanoke County, Virginia at the National C.E.C. Conference on March 24, 1972 in Washington, D. C.

THE PINKARD COURT SCHOOL PROGRAM. . . . . . . .Principal, William P. Johnson

WE TEACH THEM EVERYTHING. . . . . .TMR Teacher, Louise Wade

MUSIC: AN AID TO LEARNING FOR TMR'S . . . . . .Music Teacher, Betty Joe Harris

THE PARA-PROFESSIONAL IN THE TMR CLASSROOM. . .Teacher-Aide, Lois H. Taliaferro

THE PINKARD COURT SCHOOL PROGRAM

William P. Johnson, Principal

Pinkard Court School is a unit of the Roanoke County system located in the southwest area of Roanoke County, Virginia. The area may be classified as suburban though the school serves children from all over the county.

The facility is a relatively new structure, originally built as a "neighborhood" school to house the regular elementary program of the area. Later abandoned for it's original purpose, the building was found suited for the purpose for which it serves today--principally to house the program for the TMR children of Roanoke County. Because of it's one-floor plan and spacious classrooms, the facility serves this purpose quite well.

Presently, five classes are housed at Pinkard Court School--one primary EMR and four TMR classes. The TMR children range in age from seven to nineteen and are grouped into four levels--Primary, ages 7-9, Intermediate, ages 9-11, and 11-13, and Advanced TMR Level, ages 12-19. All socio-economic levels are represented within the student body. Our present enrollment is 56 pupils.

While Pinkard Court is a public school, entrance into the Special Education Program in Roanoke County remains voluntary. The students are admitted to the program by application from the parents or guardians after having been evaluated and found eligible through some agency--usually the Roanoke Valley Guidance Center, the Roanoke Consultation and Evaluation Clinic, public or private school personnel and private physicians.

The primary eligibility factors are the I.Q. score and previous performance in the regular school program. The highest I.Q. score allowable for admittance to the program is a full-scale score of 75. Assignment and classification are usually, but not always, based upon the recommendations of the evaluating committee or agency. Grouping or level placement is made for each child after consideration of chronological age, physical and mental development and in-school performance.

One factor which we consider a plus factor for the TMR program in Roanoke County is the transportation arrangement for these children. We have home-to-school-to-home bus service for the TMR's, with each bus having an aide for each trip, in addition to the driver.

Each class, of course, has a full-time teacher who in turn has a full-time aide, providing more strength to the classroom program in allowing for more one-to-one contact so vitally needed in such classes.

In addition to the regular classroom teacher, we have a full-time physical education teacher who conducts these activities daily, a full-time music teacher who conducts her program three times per week per class, and a part-time art instructor who introduces and teaches some art form twice monthly. A nurse is assigned to the school on a regular one day per week basis, but she will visit the school at any time during the week upon being called.

The Pinkard Court School operates under the very simple philosophy that each child has a worth as an individual and some potential, which when developed, can enhance his worth as an individual; and, if and when he is able to present himself to a classroom situation, his right to be given instruction and guidance which will aid him in developing his potential shall not be denied. We believe further that the learning environment must be one of knowledge and understanding, patience, kindness and love, and a genuine concern for one and all. Thusly, teacher and staff contentment is also a primary concern, along with our first concern, the children.

Our program of instruction for the TMR's adheres to the guides as outlined in state and local curriculum guides. We follow a structured and sequential program of learning. We, however, go one step beyond and capitalize upon the know-how and cooperative spirit of the staff. In any particular objective, we may use a multi-sensory approach involving music, physical education, drama, and the regular classroom instruction so as to provide an opportunity for each child to have some measure of success. We attempt to reduce to zero the chances for any one child to experience failure, believing that success follows success, and from success comes self-confidence, one of our major objectives in the TMR program.

Through the direct efforts and initiative of the Pinkard Court staff, the term "school" becomes real and meaningful for our TMR children. We credit our "school" approach to the TMR program (as opposed to day care and "baby sitting") for the enthusiasm, happiness and eagerness to study and learn that our children display daily. Our children use the library just as a brother or sister who attends another school. They have "homework", and our intermediate and advanced children have daily responsibilities (related to pre-vocational activities) which they perform with tremendous pride and self-confidence. These responsibilities may range from changing the calendar dates daily to raising and lowering the flags (and folding them properly) to specific tasks assigned in cooperation with the custodial and cafeteria staff.

Our future programs for our children look ever brighter. We are anxiously awaiting the completion of our million dollar special vocational center, part of which is designed and equipped especially to provide pre-vocational and vocational programs for the TMR child as he advances in physical, emotional, and mental maturity.

"AS EACH STAR DIFFERS IN BRIGHTNESS, SO DO THE CHILDREN OF MAN, YET EACH SERVES HIS PURPOSE AND CONTRIBUTES IN HIS OWN SPECIAL WAY."

WE TEACH THEM EVERYTHING

Mrs. Louise H. Wade

Teacher, TMR

We would like you to know what a real pleasure it has been for us to prepare and execute the demonstration this morning. We hope you have found it worthwhile. The entire experience has been most meaningful to us.

I would like to share a few ideas that are particularly important to me as I work with these children daily. We are all aware of disabilities, my continual search or quest is for strengths. It is through the student's strength or ability that we teach. This is my primary reason for involving music so extensively. The trainable child loves music! He comes to school with this love and God-given strength and we therefore need to utilize this throughout his development and life.

We reinforce all learning and behavior in a positive manner. The entire teaching approach, as a matter of fact approach to the child period, is a positive one.

Learning should be fun for all children. It must be for these young people. We selected two academic skills to demonstrate, for these are so vital in his adult life of semi-independence. The "game" idea tends to help the student forget the tediousness of the task. He becomes involved in the fun in the learning.

I believe the trainable retardate becomes bored much faster than we might expect and often before the skill has been mastered. We need to teach the same skill or activity in countless ways. The teacher reserves the right to beg, borrow, steal or better still, create a method enabling her to reach the student.

We planned our video-tape and demonstration to share with you a "bird's-eye" view of various aspects of our TMR class.

You may wonder why a task such as opening a can or cracking an egg would warrant the video-tape. We talk a lot about cooking, sewing, and shop activities frequently without realizing where a trainable child really must begin. We can't, we dare not, take even very basic tasks for granted. If a child can open a can, measure water, and turn on the stove he can fix lunch for himself and others. If he can crack an egg and butter toast he has breakfast. As time goes along naturally all of this becomes more complicated. We start at the beginning, gain self-confidence with success, and go from there (success breeds success).

Everyone's objective is to help these young people become as self-reliant as possible. The "housekeeping" chores are all designed to meet this need. I carry this a step further and assign week-end homework. Mothers send a written list every Monday morning of the work the teen-ager has completed at home. It takes the place of a "show and tell" language development time with added benefits. Students compete to see which boy and girl will wear the gold star on their forehead all day for doing the most work. An additional and most important bonus is the really productive person now feeling so worthwhile and a contributing member of his family. No longer waited on or only watching TV, these youngsters feel important because they are actually involved members of the household.

We can take this productivity and self-reliance beyond this point. Students help in our school in the cafeteria and with janitorial services. This is a structured part of our program (individually or in teams of two, young people learn specific skills). From these experiences we hope to eventually help in providing an opportunity for training in selected jobs in our community.

I might mention here that basically we are not talking about enormous expenditures. Tax dollars spent to train these individuals are tax dollars saved in supporting them the rest of their lives.

To achieve our objectives in assembly-line work we do volunteer work for our local Red Cross Chapter. Packing folders for the army recruits in our area is worthwhile in its contribution to others plus the essential individual cooperation in a team project. Assembling boxes to transport human blood also meets the objectives.

The demonstration today illustrates our pattern of daily activity. We move from relatively quiet periods to more active involving periods.

The opening exercises were designed to help all of us become acclimated to this setting. We begin our day with song. "Happy Talk" is our motoric activity emphasizing the "waking up" of the entire body. It is fun to give every part of us a turn to move and certainly develops body awareness and image.

Telling time will take a long time for many to really learn. The paper plate clocks utilize visual, auditory, and tactile techniques and we add motoric and music involvement to further reinforce the learning and retention.

Mrs. Harris will discuss the specifics in the musical portion of the demonstration.

Understanding the values of money is complex and very complicated for all children and particularly so for these young people. The interest in money, however, is the motivating factor, and arithmetic takes on new dimensions. How much older and more mature a 15-year-old feels when he counts pennies rather than beads or blocks. We believe in using "real" money at all times and consider any loss "depriciation" if and when it occurs. Again we capitalize on a multi-sensory approach, to me, the most logical method to use in any learning situation.

Our spontaneous movement to a favorite song was designed to demonstrate the remarkable ability to pantomime and remember. I believe activities are learned more readily and happily with this added dimension.

I thank you for your attentive listening and interest in our program. I look forward to the discussion following my colleagues' remarks for I believe the exchange of ideas and views is the most exciting part of any meeting.

MUSIC: AN AID TO LEARNING FOR TMR'S

BETTY JOE HARRIS

Music Teacher
Special Education

I hope that our demonstration has shown that exceptional children receive music enthusiastically and that they can benefit from and be enriched by participation in music.

We have tried to show that music is an integral part of our coordinated curriculum approach to teaching the TMR. I am sure you realize that degrees of improvement could not be shown in this limited time.

In my work with these pupils, I know how meaningful music is to the TMR, when one who is seemingly non-verbal and most certainly an introvert, volunteers to sing his favorite song while standing before his peers. I know this when one who is quite physically ill requests to sing solo at almost every music session. I also know that singing is meaningful when one member of the class scolds another for not singing on pitch.

In our program there has been a concerted effort on my part, as the teacher of music, to help these pupils improve their singing. Feeling as we do, that music is one of the strengths of the TMR curriculum, we begin with his voice. Through his voice, self-awareness is developed, along with pitch recognition and pitch production. Pitch recognition of a song comes quickly, but vocal pitch production is a different story. It is my belief that through an intensive ear-training study most pitch production can be improved. We have, therefore, spent much time in this one area of music. Through this study we are increasing listening skills which are present in all music activity and imperative in all learning.

I can think of no better way to stimulate speech and word formation than through singing; nor do I know of a better way to communicate moods, attitudes and feelings than through songs.

Because of Mrs. Wade's dynamic teaching skills and her background in dance and drama, these pupils have performed excerpts from Peter Pan, The Wizard of Oz and Bambi. These presentations have demonstrated that through music, dance and drama, our pupils find themselves as worthwhile contributing individuals.

This leads me to the criteria used for the selection of songs and other materials.

1. Is the content worthwhile and meaningful to the pupil?
2. Does it motivate and stimulate the participant in the context of the pupil's total life experience?
3. Does the material present a challenge within his scope of learning?

Presently, there is no emphasis on learning music symbols. My utmost concern is that the child finds pleasure and success through his involvement in music.

I do think that through the concepts of melody and rhythm we have some of the most versatile teaching tools in special education. I believe that through music most classroom work can be reinforced. Along with this reinforcement of academic skills, there is no question about music's contribution to motoric skills. Someone has said that a genius can afford to be a "motor moron" but the child with a low IQ cannot.

Playing rhythm instruments, autoharp, bongo drums and piano all contribute to motor development. The experience of playing "Hot Cross Buns," which you saw demonstrated this morning, not only helped a great deal in developing finger dexterity but was great fun for the pupil. He has proven to himself that he can manipulate the instrument used by me to help him improve his voice, thus making him more keenly aware of pitch recognition and pitch production. Hopefully, he has realized that the piano is not a "touch-me-not".

You saw how we used the piano as an aid in teaching the concept of "more and less". Pupils played an "up" sound found at right keyboard; a "down" sound found at left keyboard. The pupil has thus learned a fundamental music concept of "high and low", which in turn reinforces another major concept of "right and left" and helped him learn "more and less" in the money value concept. High is equated with more; low equated with less.

In the clock activity we used resonator bells because of their resemblance to a chiming clock, clarity of pitch, easy manipulation and for the development of eye-hand coordination. Again, major concepts were reinforced; the lower the number the lower the pitch and likewise the higher the number the higher the pitch.

These illustrations of music as an aid to learning demonstrate methods used to increase vocabulary and reinforcement techniques of many concepts.

As so beautifully defined, music is the universal language. With the TMR, music provides a universal source of curriculum ideas. I hope you, too, will use it extensively in your curriculum.

THE PARA-PROFESSIONAL IN THE TMR CLASSROOM

Lois H. Taliaferro

Teacher-Aide

The aide, under the direction of the classroom teacher, is involved in every phase of the TMR program of activities conducted in the classroom. The duties involved may be classified into four major areas, though we may find tremendous overlapping from area to area: (1) Instructional assistance (2) Supervisory assistance, (3) Clerical assistance, and (4) Housekeeping assistance.

As an aide, I have the responsibility of knowing, period by period, the instructional plan for the day. I lend support to the teacher by getting together pre-planned and previously prepared materials, arranging if needed, the instructional area, and finally, assisting with instruction by working with small groups or an individual student. I perform other tasks such as reviewing with the student word charts, color discrimination charts, numbers, the letters in his name, and other activities related to Language Arts instruction.

Other instructional assistance is provided by the use of audio-visual materials. I arrange previously selected materials, set up and operate projectors, tape recorders, record players, etc. and see to it that items of equipment and materials are put away at the end of any particular phase of instruction.

In the area of Arts and Crafts many of the materials that are used must be prepared in advance. I assist the teacher in this area. After paints, brushes, paper, and other related materials have been prepared and distributed, I help the children where needed with their activity. There is always the chore of cleaning the area and restoring the materials to their proper place. I usually give supervision to the children in performing this task.

The need for para-professional assistance in the TMR program so as to provide for the often desired one-to-one relationship with the child, is most evident in the area of pre-vocational skills instruction. I give direct assistance to each child or a part of the group in housekeeping skills including opening cans, cooking, washing dishes, setting the table, making beds, vacuuming, sweeping with a broom, polishing furniture, ironing, washing windows, and polishing shoes.

A vital part of the TMR program with which I work is in the area of Dramatics. Our children have taken part in the presentation of simplified versions of Peter Pan, Wizard of Oz, Bambi, and Forest Friends, an original skit prepared for the dedicatory exercises of Camp Virginia Jaycee. As an aide, I took part in activities such as assisting in planning, adapting the stories to suit our purposes, voice characterizations as the stories were tape recorded, rehearsing with the children, preparation of costumes and properties, and applying make-up to the characters for the presentation of the production.

It is difficult to say where instructional assistance ends and supervisory assistance begins. As an aide to the classroom teacher of TMR students, I assist with supervision of the students in the lunchroom, on the playground, in the library, loading and unloading of buses and on field trips. In short, anywhere the child might be when he is under control of school personnel, is an area where I assist with supervision.

There are many instances during any school day when the classroom aide may assist the teacher with clerical duties. My duties involve typing notes and letters, mimeographing instructional materials, keeping records of classroom funds, and maintaining student files, both accumulative and class work files. We may include under clerical assistance the many instances where it becomes necessary to make telephone contact with a parent or guardian concerning the child. Generally, I can assist the teacher by performing this task.

All of the tasks described in the previous categories (instructional, supervisory, clerical) may be included in the housekeeping category, for there is always the need to make preparation for an activity and to rearrange, put away, clean up, and prepare for the next activity. The aide assists with all of this as we attempt to maintain an environment that will be most conducive for learning.

How does the child benefit from the services of a teacher's aide? In a real sense, the TMR child has the benefit of much-needed individual help as the teacher is freed to give more time with concentrated efforts in the areas of her expertise. In addition, the child is exposed to at least one other person who is different from the classroom teacher. The aide helps the child as he moves in the direction of social competence, as he observes what should be a sound, amicable, respectful, and cooperative relationship between two adult persons.

There are specific qualities which one must possess in order to be an effective aide in a TMR classroom. The aide should be knowledgable, at least to the extent that she knows what is generally expected of the TMR child. This knowledge should be sought either through continuous individual study or through formalized programs established for the aides. Fortunately, in Roanoke County, Virginia, through the benefits of federal programs under ESEA Title I, the aides are given in-service training through local colleges and through extension services of some of our state institutions.

Likewise, the aide must be able to relate to each individual child and to co-workers. She should be personable, patient, understanding, and above all she must really want to work with mentally retarded children.

The aide in the TMR classroom is a very real part of the class. The contributions that she makes to the class are returned ten-fold in the form of gratitude from the children and pride in their accomplishments.